



## **VISION**

- To create a unique and futuristic space in imparting quality higher education in Computer Science in the International arena and to augment a pool of knowledge base for the uplift of the Indian society and to manifest the perfection and quality in the mankind.

## **MISSION**

- To contribute to the overall development of the society on the national and global scale, be excellence in education, Teaching-Learning and engaging the Student with Extra-Curricular activities on par with by international standards.

## **PROGRAMME OUTCOME:**

**PO 1:** Implement knowledge of computing fundamentals, computing specialization and domain knowledge for the abstraction and conceptualization of computing models.

**PO 2:** Identify and Analyze user needs and use them in the selection, creation of high level reliable software systems.

**PO 3:** Use the techniques, skills and modern hardware and software tools necessary for innovative software solutions.

**PO 4:** Employ essential IT support skills gained to install, configure, secure and ability to do preliminary Troubleshooting.

**PO 5:** Collaborate effectively with teams to accomplish shared computing design, evaluation, or implementation goals.

## **PROGRAMME SPECIFIC OUTCOME:**

**PSO 1 :** Employ appropriate concepts of problem-solving methods for varied applications

**PSO 2 :** Develop aptitude to meet the challenges and keep themselves abreast of the upcoming trends in the IT industry

**B.Sc. (COMPUTER SCIENCE)  
COURSE STRUCTURE 2018-19 BATCH**

Semester	Part	Course Component	Subject Code	Subject Name	Credits	HOURS	Internal	External	Total
<b>Semester - I</b>	I	Language	17UTAMF01/ 16USANF01/ 16UHINF01/ 16UFREF01	Language - I	3	6	50	50	100
	II	English	16UENGF41	English - I	3	4	50	50	100
	III	Core Paper-I	17UCSCC01	Problem Solving using C Programming	4	6	50	50	100
	III	Core Paper-II	17UCSCC02P	Problem Solving using C Practical	4	4	50	50	100
	III	Allied-I	16UMATA11	Mathematics I	5	6	50	50	100
	IV	Non Major Elective-I / Basic / Advance Tamil	17UNME01B/ 16UBAT401	Advanced Tamil - I / Basic Tamil –I / Office Automation Tools – Practical	2	2	50	50	100
	IV	Soft Skills-I	17UGSLS01	Listening and Speaking Skills	3	2	-	100	100
<b>Total Credits: 24 / Total HOURS per week: 30</b>									
<b>Semester - II</b>	I	Language	17UTAMF02/ 16USANF02/ 16UHINF02/ 16UFREF02	Language – II	3	6	50	50	100
	II	English	16UENGF42	English - II	3	4	50	50	100
	III	Core Paper-III	18UCSCC03	Programming in C++	4	5	50	50	100
	III	Core Paper-IV	18UCSCC04P	Programming in C++ - Practical	4	4	50	50	100
	III	Allied-II	16UMATA15	Mathematics II	5	7	50	50	100
	IV	Non Major Elective-II / Basic / Advance Tamil	16UNME02KP/ 16UBAT402	Advanced Tamil - II / Basic Tamil –II / HTML Lab-Practical	2	2		100	100
	IV	Soft Skills-II	17UGSLS02	Reading and Writing Skills	3	2		100	100
<b>Total Credits: 24 / Total HOURS per week: 30</b>									

**B.Sc. (COMPUTER SCIENCE)  
COURSE STRUCTURE 2018-19 BATCH**

Semester	Part	Course Component	Subject Code	Subject Name	Credits	HOURS	Internal	External	Total
<b>Semester - III</b>	I	Language	16UTAMF03/ 16USANF03/ 16UHINF03/ 16UFREF03	Language - III	3	6	50	50	100
	II	English	16UENGF43	English - III	3	4	50	50	100
	III	Core Paper-V	18UCSCC05	Analysis of Algorithms and Data Structures	4	6	50	50	100
	III	Core Paper-VI	18UCSCC06P	Analysis of Algorithms and Data Structures Using C++	4	4	50	50	100
	III	Allied-III	18UMATA19	Operations Research	5	8	50	50	100
	IV	Soft Skills-III	16UGSLS03	Personality Enrichment	3	2	-	100	100
<b>Total Credits: 22 / Total HOURS per week: 30</b>									
<b>Semester - IV</b>	I	Language	16UTAMF04/ 16USANF04/ 16UHINF04/ 16UFREF04	Language - IV	3	6	50	50	100
	II	English	16UENGF44	English - IV	3	4	50	50	100
	III	Core Paper-VII	17UCSCC07	Programming in JAVA	4	6	50	50	100
	III	Core Paper-VIII	17UCSCC08P	Programming in Java-Practical	4	4	50	50	100
	III	Allied-IV	16UMATA25	Statistical Methods and their Applications	5	4	50	50	100
	III	Allied-IV	16UMATA26P	Statistical Methods and their Applications - Practical	-	2	50	50	100
	IV	Soft Skills-IV	16UGSLS06	Quantitative Aptitude	3	2		100	100
	IV	EVS	16UEVS401	Environmental Studies	2	2	-	100	100
<b>Total Credits: 24 / Total HOURS per week: 30</b>									

**B.Sc. (COMPUTER SCIENCE)  
COURSE STRUCTURE 2018-19 BATCH**

Semester	Part	Course Component	Subject Code	Subject Name	Credits	HOURS	Internal	External	Total
<b>Semester - V</b>	III	Core Paper-IX	16UCSCC09	Operating Systems	4	6	50	50	100
	III	Core Paper-X	17UCSCC10	Digital Logic and Computer Architecture	4	6	50	50	100
	III	Core Paper-XI	17UCSCC11	Visual Programming and Database Management System	4	6	50	50	100
	III	Core Paper-XII	17UCSCC12P	Visual Programming – Practical	4	6	50	50	100
	III	Elective-I (Interdisciplinary Elective)	17UCSCE01P/ 17UCSCE04	Linux Programming Practical / Python Programming Practical	5	5	50	50	100
	IV	Value Education	16UVED401	Value Education	2	1	*	100	100
<b>Total Credits: 23 / Total HOURS per week: 30</b>									
<b>Semester - VI</b>	III	Core Paper-XIII	17UCSCC13	Data Communication & Networking	4	6	50	50	100
	III	Core Paper-XIV	17UCSCC14	Web Programming with PHP and MySQL	4	6	50	50	100
	III	Core Paper-XV	17UCSCC15P	Web Programming with PHP and MySQL - Practical	4	6	50	50	100
	III	Elective-II	16UCSCE02/ 17UCSCE03/ 16UCSCE04	Software Engineering/Data Mining /Software Testing	5	6	50	50	100
	III	Elective-III	16UCSCE03	Mini Project	5	6	50	50	100
	V	Extension Activity	17UEXT501	Participation in NSS/NCC/ROTRACT etc.	1	-	-	-	-
<b>Total Credits: 23 / Total HOURS per week: 30</b>									
<b>Grand Total Credits: 140 / Total Hours per week: 180</b>									

\* Examination will be conducted in even semester

**CORE PAPER-I**  
**PAPER TITLE: PROBLEM SOLVING USING C PROGRAMMING**

<b>SUBJECT CODE :17UCSCC01</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: I</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- The course provides complete knowledge of problem-solving techniques.
- Develop an in-depth understanding of functional and logical programming paradigms using C Programming Language

**UNIT I: (18 Hours)**

**COMPUTER FUNDAMENTALS:** Basic Computer Organization - Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices.

**PLANNING THE COMPUTER PROGRAM:** Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Techniques of Problem Solving: Flowcharting, algorithms, Programming methodologies viz. top-down and bottom-up programming.

**UNIT II: (18 Hours)**

C fundamentals Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.

Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

**UNIT III: (18 Hours)**

Functions –Definition - proto-types - Passing arguments - Recursions. Storage Classes - Automatic, External, Static, Register Variables.

**UNIT IV: (18 Hours)**

Arrays - Defining and Processing - Passing arrays to functions – Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Unions - Bit wise operations.

**UNIT V: (18 Hours)**

Pointers - Declarations - Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files: Creating, Processing, Opening and Closing a data file.

**PRESCRIBED BOOKS:**

1. P. K. Sinha & Priti Sinha, “Computer Fundamentals”, BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. E. Balaguruswamy, 1995, Programming in ANSI C, TMH Publishing Company Ltd.
4. Kanetkar Y., 1999, Let us C, BPB Pub., New Delhi.

**REFERENCE BOOKS:**

1. K.R.Venugopal,Programming with C,1997,McGraw-Hill
2. Varalakshmi,Programming using C,2000(Reprint July 2001), V.Ramesh5
3. R.Rajaram, C Programming Made Easy,V.Ramesh
4. B.W. Kernighan and D.M.Ritchie, 1988,The C Programming Language, 2<sup>nd</sup> Edition, PHI.
5. H. Schildt, C,2004, The Complete Reference, 4<sup>th</sup> Edition, TMH
6. Gottfried,B.S, 1996,Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi .

**WEBSITES:**

1. <http://www.cprogramming.com/>
2. <http://www.richardclegg.org/previous/ccourse>

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 8	13-20	6	30
C	Answer any 4 out of 6	21-26	10	40
<b>TOTAL</b>		<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	NO. of Questions	
		Theory	Problems
Section A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
Section B	Unit – 1	2	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	2	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER-II**  
**PAPER TITLE: PROBLEM SOLVING USING C PRACTICAL**

<b>SUBJECTCODE:17UCSCC02P</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: I</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:60</b>

**COURSE OBJECTIVES:**

- To learn problem solving techniques.
- This course provides to write C programs using decision making, branching, looping constructs.

**(20 Hours)**

1. Write a program to add, subtract, multiply and divide two numbers using menu driven program.(Arithmetic operation)
2. Write a program to check if a number is even or odd(if-else)
3. Write a program to find the largest of three numbers.(using if-else, logical and)
4. Write a program to find the maximum and minimum of n numbers (using for- statement)
5. Write a program to check for prime number(do while loop)

**(20 Hours)**

6. Write a program to check for Armstrong number(while loop)
7. Write a program to accept day number and print the day of the week.(switch)
8. Write a program for counting the number of vowels, consonants, words, white spaces in a line of text (switch)
9. Write a program to arrange a set of numbers in ascending order.(1D Array)
10. Write a program to implement linear search.(1D Array)

**(20 Hours)**

11. Write a program to implement binary search. (1D Array).
12. Write a program to add two matrices (2D Arrays)
13. Write a program to check whether a string is a palindrome or not. (String)
14. Write a program to print Fibonacci series using function.
15. Write a program to find factorial of a number using recursive function.



**COURSE COMPONENT: ALLIED MATHEMATIC  
MATHEMATICS – I  
(For B.Sc. Computer Science and BCA)**

<b>SUBJECTCODE: 16UMATA11</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: I</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVE:**

- To improve basics in Mathematics and analytical skills

**UNIT I** **(18 Hours)**

**ALGEBRA:** Summation of Series - Binomial, Exponential and Logarithmic Series (Without proof) and Simple Problems.

Chapter 2, Section 2.1.3, 2.2, 2.2.1, 2.3, 2.3.3

**UNIT II:** **(18 Hours)**

**MATRICES:** Eigen Values – Eigen Vectors - Cayley - Hamilton Theorem (without proof)

Chapter 4 Section 4.5, 4.5.2, 4.5.3

**UNIT III:** **(18 Hours)**

**THEORY OF EQUATIONS:** Polynomial equations, irrational roots, complex roots, Reciprocal equations - Approximation of roots of a polynomial equation by Newton's Method  
Chapter 3, Section 3.1 to 3.4.1

**UNIT IV:** **(18 Hours)**

**DIFFERENTIAL CALCULUS:**  $n^{\text{th}}$  derivatives - Leibnitz Theorem - Jacobians - Radius of Curvature (Cartesian Coordinates only) – Maxima and Minima of functions of two variables.

Chapter 1, Section 1.1.1 to 1.3.1 and Section 1.4.3

**UNIT V:** **(18 Hours)**

**TRIGONOMETRY:** Expansions of  $\text{Sinn}\theta$ ,  $\text{Cosn}\theta$ ,  $\text{tann}\theta$  - Expansions of  $\text{Sin}^n\theta$ ,  $\text{Cos}^n\theta$ - Hyperbolic and Inverse hyperbolic functions.

Chapter 6, Section 6.1 to 6.3.

Content and treatment as in

Allied Mathematics Volume I and II by P. Duraipandian and S. Udayabaskaran, S. Chand Publications

**PRESCRIBED BOOKS:**

- Allied Mathematics, A. Singaravelu.
- Ancillary Mathematics, A. Manickavasagam Pillai and Narayanan.
- Allied Mathematics, P.R. Vittal.

**REFERENCE BOOKS:**

- Allied Mathematics, S.G. Venkatachalapathy
- P. Kandasamy and K. Thilagavathi, Allied Mathematics Volume I and Volume II -- 2004, S. Chand and

Co, New Delhi.

3. Ancillary Mathematics Volume 1 and 2 by P.Balasubramanian&K.G. Subramanian.

**WEBSITES:**

1. [www.freetechbooks.com/mathematics-f38.html](http://www.freetechbooks.com/mathematics-f38.html)
2. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)
3. [www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html](http://www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html)

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
Section A	<b>Definition / Principles</b> Answer any <b>10</b> questions	1 – 12	2	<b>20</b>
Section B	<b>Short Answer</b> Answer any <b>5</b> questions out of 7	13–19	5	<b>35</b>
Section C	<b>Essay</b> Answer any <b>3</b> questions out of 5	20– 24	15	<b>45</b>
	<b>TOTAL</b>	<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	No. of Questions	
		Theory	Problems
Section A	Unit – 1		2
	Unit – 2	1	1
	Unit – 3	1	1
	Unit – 4		2
	Unit – 5		2
Section B	Unit – 1		1
	Unit – 2		2
	Unit – 3		2
	Unit – 4		1
	Unit – 5		1
Section C	Unit – 1		1
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1
	Unit - 5		1

**NON MAJOR ELECTIVE-I**  
**PAPER TITLE: OFFICE AUTOMATION TOOLS – PRACTICAL**

<b>SUBJECT CODE: 17UNME01B</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: I</b>	<b>CREDITS: 2</b>	<b>TOTAL HOURS: 30</b>

**COURSE OBJECTIVE:**

- To provide hands-on use of features like mail merge in MS Word, formatting, chart in Excel
- To learn how to create a Presentation and work with slides, text, images and animations

**MS WORD**

1. Text Manipulation
2. Bullets And Numbering
3. Header And Footer
4. Text Formatting And Print Options
5. Table Creation

**MS EXCEL**

6. Using formulas and functions like SUM(), AVERAGE(),IF()
7. Drawing Chart

**MS POWER POINT**

8. Creating Power Point Presentation

**CORE PAPER-III**  
**PAPER TITLE: PROGRAMMING IN C++**

<b>SUBJECT CODE :18UCSCC03</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: II</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To introduce object-oriented concepts using C++
- The major objective of this course to cover the design, analysis, and implementation of basic programs using C++.

**UNIT I:**

**(18 Hours)**

**PRINCIPLES OF OBJECT-ORIENTED PROGRAMMING:** A Look at Procedure Oriented Programming – Object- Oriented Programming Paradigm – Basic Concepts of Object- Oriented Programming – Benefits of OOP – Applications of OOP

**Tokens, Expressions and Control Structures :** Introduction – Tokens – Keywords - Identifiers and Constants – Basic Data Types – User Defined Data Types – Derived Data Types – Symbolic Constants – Type Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Scope Resolution Operator – Member Dereferencing Operators – Memory Management Operators – Manipulators – Type Cast Operator – Expressions and their Types – Special Assignment Expressions – Implicit Conversions – Operator Overloading – Operator Precedence – Control Structures

**UNIT II:**

**(18 Hours)**

**FUNCTIONS IN C++:** Introduction – The main function – Function Prototyping – Call by Reference – Inline Functions – Default Arguments – const Arguments – Function Overloading– Math Library Functions

**UNIT III:**

**(18 Hours)**

**CLASSES AND OBJECTS:** Introduction – C Structures Revisited – Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a Class – Memory Allocation for Objects – Static Data Members – Static Member Functions – Arrays of Objects - Objects as Function Arguments – Friendly Functions – Returning Objects – const Member Functions – Pointers to Members.

**Constructors and Destructors:** Introduction – Constructor – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Dynamic Initialization of Objects – Copy Constructors – Constructing Two-dimensional Arrays – const Objects – Destructors

**UNIT IV:**

**(18 Hours)**

**OPERATOR OVERLOADING AND TYPE CONVERSIONS:** Introduction – Defining Operator Overloading – Overloading Unary Operators – Overloading Binary Operators – Overloading Binary Operators Using Friends – Manipulation of Strings Using Operators – Rules for Overloading Operators – Type Conversions

**INHERITANCE: EXTENDING CLASSES:** Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Base Classes – Abstract Classes – Constructors in Derived Classes – Member Classes: Nesting of Classes

**UNIT V:****(18 Hours)**

**POINTERS, VIRTUAL FUNCTIONS AND POLYMORPHISM:** Introduction – Pointers – Pointers to Objects – this Pointer – Polymorphism - Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions

**MANAGING CONSOLE I/O OPERATIONS:** Introduction – C++ Streams – C++ Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – Managing Output with Manipulators

**WORKING WITH FILES:** Introduction – Classes for File Stream Operations – Opening and Closing a File – Detecting end-of-file – More about Open(): Files Modes – File Pointers and Their manipulations – Sequential Input and Output Operations – Updating a File: Random Access – Error Handling During File Operations

**PRESCRIBED BOOKS:**

1. E. Balagurusamy, 1995, Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.

**REFERENCE BOOKS**

1. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.
2. H.Schildt, C++, 1998, The Complete Reference-1998-TMH Edition, 1998

**WEBSITES:**

1. <http://www.cprogramming.com/algorithms-and-data-structures.html>

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
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C	Answer any 4 out of 6	21-26	10	40
<b>TOTAL</b>		<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	NO. of Questions	
		Theory	Problems
Section A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
Section B	Unit – 1	2	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER-IV**  
**PAPER TITLE: PROGRAMMING IN C++ - PRACTICAL**

<b>SUBJECT CODE:18UCSCC04P</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: II</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:60</b>

**COURSE OBJECTIVES:**

- To implement various OOPs concepts with the help of programs.
- The major objectives is to implement the concept of function overloading, operator overloading, virtual functions and polymorphism

**SIMPLE PROGRAMS**

1. Program to print average of n integers.
2. Program to illustrate call by value & call by reference.
3. Program to multiply two matrices.

**(20 Hours)**

**CLASS**

4. Student Mark Sheet preparation using Class
5. Class and Object Implementation: to display item and cost

**CONSTRUCTOR AND DESTRUCTOR**

6. Constructor and Destructor implementation

**(20 Hours)**

**INLINE FUNCTION AND FRIEND FUNCTION**

7. To multiply and divide two floating point numbers using inline function
8. To swap private data of two classes using friend function

**POLYMORPHISM**

9. Function Overloading
10. Overloading unary minus
11. Overloading binary operators – Complex number addition

**(20 Hours)**

**INHERITANCE**

12. Single inheritance
13. Multilevel inheritance

**STREAMS**

14. Program to implement Formatted I/O operations.
15. Reading and writing a class object using file

**COURSE COMPONENT: ALLIED MATHEMATICS – II**  
**MATHEMATICS – II**  
**(For B.Sc. Computer Science and BCA)**

<b>SUBJECT CODE: 16UMATA15</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: II</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To improve basics in mathematics and analytical skills

**UNIT-I: (18 Hours)**

**INTEGRAL CALCULUS :-** Bernoulli's formula – Reduction formula for  $\int \sin^n x \, dx$  -  $\int \cos^n x \, dx$ .  
 Chapter 2, Sections 2.7 and 2.9

**UNIT- II: (18 Hours)**

**FOURIER SERIES :**Fourier series for function in  $(\alpha, \alpha + 2\pi)$ , Half-range Sine and cosine series  
 Chapter 4, Section 4.1 to 4.2

**UNIT – III: (18 Hours)**

**DIFFERENTIAL EQUATION:** Second order Differential Equation with Constant Coefficient s.  
 Differential equation of the form  $(aD^2 + bD + C)y = e^{ax} \phi(x)$  where a, b, c are constants,  $\phi(x) = \sin mx$   
 (or)  $\cos mx$  (or)  $x^m$ .

**PARTIAL DIFFERENTIAL EQUATION :** Eliminating Arbitrary constants and functions - Four  
 Standard types.  $f(p,q) = 0$ ;  $f(x,p,q) = 0$ ,  $f(y,p,q) = 0$ ,  $f(z,p,q) = 0$ .

Chapter 5, Section 5.2, 5.2.1

Chapter 6, Section 6.1 to 6.3

**UNIT – IV: (18 Hours)**

**LAPLACE TRANSFORMATION -** Basic Properties and Simple Problems -

$L[e^{at} f(t)] - L[t^n f(t)] - L[e^{at} t f(t)] - L[f(t)/t]$ .

Chapter 7, Section 7.1.1 to 7.1.4

**UNIT – V: (18 Hours)**

**INVERSE LAPLACE TRANSFORMATION :** - Solving Differential Equation using Laplace  
 Transformation.

Chapter 7, Section 7.2 to 7.3

Content and treatment as in

Allied Mathematics Volume I and II by P. Duraipandian and S. Udayabaskaran, S. Chand  
 Publications

**PRESCRIBED BOOKS:**

1. Allied Mathematics, A. Singaravelu.
2. Ancillary Mathematics, A. Manickavasagam Pillai and Narayanan.
3. Allied Mathematics, P.R. Vittal.

**REFERENCE BOOKS:**

1. Allied Mathematics, S.G. Venkatachalapathy
2. P.Kandasamy and K.Thilagavathi, Allied Mathematics Volume I and Volume II -- 2004, S.Chand and Co, New Delhi.
3. Ancillary Mathematics Volume 1 and 2 by P.Balasubramanian&K.G. Subramanian.

**WEBSITES:**

1. [www.freetechbooks.com/mathematics-f38.html](http://www.freetechbooks.com/mathematics-f38.html)
2. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)
3. [www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html](http://www.freebookcentre.net/SpecialCat/Free-Mathematics-Books-Download.html)

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
<b>Section A</b>	<b>Definition / Principles</b> Answer any 10 questions	1 – 12	2	<b>20</b>
<b>Section B</b>	<b>Short Answer</b> Answer any 5 questions	13–19	5	<b>35</b>
<b>Section C</b>	<b>Essay</b> Answer any 2 questions	20– 24	15	<b>45</b>
	<b>TOTAL</b>	<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	No. of Questions	
		Theory	Problems
<b>Section A</b>	Unit – 1		2
	Unit – 2	1	1
	Unit – 3		2
	Unit – 4		2
	Unit – 5		2
<b>Section B</b>	Unit – 1		1
	Unit – 2		1
	Unit – 3		2
	Unit – 4		2
	Unit – 5		1
<b>Section C</b>	Unit – 1		1
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1
	Unit - 5		1



**NON MAJOR ELECTIVE  
PAPER TITLE: HTML LAB - PRACTICAL**

<b>SUBJECT CODE:16UNME02KP</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: II</b>	<b>CREDITS: 2</b>	<b>TOTAL HOURS: 30</b>

**COURSE OBJECTIVES:**

- To train how to apply html tags
- Train students to develop Simple websites

1) Create an HTML document with the following formatting options:

- I. Bold
- II. Italics
- III. Underline
- IV. Headings (Using H1 to H6 heading styles)
- V. Font (Type, Size and Color)

2) Ordered List

3) Create an HTML document which consists of Unordered List

4) Create an HTML document which implements Internal linking as well as external linking.

5) Create a table using HTML which consists of columns for Roll No., Student's name and grade.

Result		
Roll No.	Name	Grade

6) Create a form using HTML which has the following types of controls:

- I. Text Box
- II. Option/radio buttons
- III. Check boxes
- IV. Reset and Submit buttons

7) Create HTML documents (having multiple frames) in the following three Formats:

Frame1
Frame2

8) Create a HTML document to add image

9) Design mark sheet using HTML tags.

10) Create Guru Nanak College Website using HTML tags

**CORE PAPER- V**  
**PAPER TITLE: ANALYSIS OF ALGORITHMS AND DATA STRUCTURES**

<b>SUBJECT CODE :18UCSCC05</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: III</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To ensure that the student evolves into a competent programmer capable of designing and analyzing implementations of algorithms and data structures for different kinds of problems.
- To choose appropriate data structures and algorithms, understand the ADT/libraries, and use it to design algorithms for a specific problem.

**UNIT I: (18 Hours)**

Introduction: Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm.  
Algorithm Design Techniques: Iterative techniques, Divide and Conquer Algorithms.

**UNIT II: (18 Hours)**

Sorting Techniques: Elementary sorting techniques - Bubble Sort, Insertion Sort, Merge Sort, Selection Sort - Advanced Sorting Techniques-Heap Sort, Quick Sort. Searching Techniques: Linear and Binary search.

**UNIT III : (18 Hours)**

Arrays: Single and Multi-dimensional Arrays, Sparse Matrices -Stacks: Implementing stack using array and linked list, Recursion - Prefix, Infix and Postfix expressions, Conversion from Infix to Postfix -Postfix evaluation.

**UNIT IV: (18 Hours)**

Queues: Array and Linked representation of Queue, De-queue, Priority Queues- Circular Queue-Linked Lists: Singly, Doubly, representation of Stack and Queue as Linked Lists.

**UNIT V: (18 Hours)**

Trees: Introduction to Tree as a data structure; Binary Trees, Binary Search Tree: Creation and Traversal: Inorder, Preorder and Postorder. Graph: Definition, Types of Graphs, Traversal – Breadth First Search and Depth First Search.

**PRESCRIBED BOOKS:**

1. SartajSahni, Data Structures, "Algorithms and applications in C++", Second Edition, Universities Press, 2011.
2. E.Horowitz and S.Shani,1999,Fundamentals of Data Structures in C++ , Galgotia Pub.

**REFERENCE BOOKS:**

1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein-Introduction to Algorithms, PHI, 3rd Edition 2009.
2. Sarabasse & A.V. Gelder Computer Algorithm –Introduction to Design and Analysis,Publisher– Pearson 3rd Edition 1999.
3. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.
4. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.

5. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.
6. D.S Malik, Data Structure using C++, Second edition, Cengage Learning, 2010.

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 8	13-20	6	30
C	Answer any 4 out of 6	21-26	10	40
<b>TOTAL MARKS</b>		<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	NO. of Questions	
		Theory	Problems
<b>Section A</b>	Unit – 1	2	
	Unit – 2	3	
	Unit – 3	3	
	Unit – 4	2	
	Unit – 5	2	
<b>Section B</b>	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
<b>Section C</b>	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER- VI**

**TITLE: ANALYSIS OF ALGORITHMS AND DATA STRUCTURES USING C++**

<b>SUBJECT CODE :18UCSCC06P</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: III</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:60</b>

**COURSE OBJECTIVES:**

- Implement various algorithms and data structures in C++
- Compare the performance of different algorithms for same problem

Implement Insertion Sort (The program should report the number of comparisons)

**(30 Hours)**

1. Implement Merge Sort(The program should report the number of comparisons)
2. Implement Selection Sort ((The program should report the number of comparisons)
3. Implement Quick Sort (The program should report the number of comparisons)
4. Array implementation of stack
5. Conversion of infix to postfix using stack operations
6. Postfix Expression Evaluation.

**(30 Hours)**

7. Array implementation of Queue
8. Implementation of Recursive function –Fibonacci series
9. Implementation of Single Linked list
10. Implementation of stack using linked list
11. Implementation of queue using linked list
12. Implementation of Doubly Linked list
13. Creation and traversal of Binary Search Tree. (Preorder, Inorder, Postorder)
14. Creation and traversal of Graph (DFS, BFS)

**ALLIED PAPER-III**  
**PAPER TITLE: OPERATIONS RESEARCH**

<b>SUBJECT CODE: 18UMATA19</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: III</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS: 120</b>

**COURSE OBJECTIVES:**

- To give an overall idea about the various Optimization techniques and their usages

**UNIT – I: (24 Hours)**

Introduction to Operations Research - Linear Programming - Formulation - Graphical Solution - Simplex method.

Chapter 1, Section 1.1 to 1.4

Chapter 2, Section 2.1 to 2.28

Chapter 3, Section 3.1 to 3.54

Chapter 4, Section 4.1 to 4.31

**UNIT II: (24 Hours)**

Big-M Method – Two-Phase method – Duality Dual-Primal relation – Dual Simplex Method.

Chapter 5, Section 5.1 to 5.14

Chapter 6, Section 3.1 to 6.35

Chapter 7, Section 7.1 to 7.37

Chapter 8, Section 8.1 to 8.35

**UNIT – III: (24 Hours)**

Transportation Problem -- Assignment Problem.

Chapter 10, Section 10.1 to 10.73

Chapter 11, Section 11.1 to 11.6

**UNIT – IV: (24 Hours)**

Sequencing problem, n jobs through 2 machines, n jobs through 3 machines

Chapter 12

Game theory: Two person – Zero game with saddle point – without saddle point – Dominance – solving 2 x n game or m x 2 game by graphical method

Chapter 15

**UNIT – V: (24 Hours)**

PERT – CPM: Project Network Diagram – Critical Path (Crashing excluded) – PERT computation

Chapter 14, Section 14.1 to 14.70

Content and treatment as in

Operations Research by P.R.Vittal and V.Malini

**PRESCRIBED BOOKS:**

1. V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan – Resource Management Techniques (Operations Research).
2. Introduction to Operations Research, P.R.Vittal
3. Gupta P.K. and HiraD.S. Problems in Operations Research, S.Chand & Co.

**REFERENCE BOOKS:**

- 1.KantiSwaroop, Gupta P.K. and Manmohan – Problems in Operations Research, Sultan Chand & Sons.
2. Ravidran A., Philips,D.T. and Solberg J.J.,Operations Research, John Wiley & sons.
- 3.Taha H.A., Operations Research, Macmillian Publishing company, Newyork.

**WEBSITES:**

1. [www.researchgate.com](http://www.researchgate.com)
2. [www.freecomputerbooks.com/special/operationsresearch.html](http://www.freecomputerbooks.com/special/operationsresearch.html)
3. [www.freetechbooks.com](http://www.freetechbooks.com)

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
<b>Section A</b>	<b>Definition / Principles</b> Answer any 10 questions	1 – 12	2	<b>20</b>
<b>Section B</b>	<b>Short Answer</b> Answer any 5 questions	13–20	8	<b>40</b>
<b>Section C</b>	<b>Essay</b> Answer any 2 questions	21–24	20	<b>40</b>
	<b>TOTAL MARKS</b>	<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	No. of Questions	
		Theory	Problems
<b>Section A</b>	Unit – 1	1	1
	Unit – 2	1	1
	Unit – 3	1	1
	Unit – 4	1	1
	Unit – 5	1	1
<b>Section B</b>	Unit – 1		1
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1
	Unit – 5		1
<b>Section C</b>	Unit – 1		21(a),21(b)
	Unit – 2		22(a),22(b)
	Unit – 3		23(a)
	Unit – 4		23(b),24(a)
	Unit - 5		24(b)

**For Section A:** Two questions can be taken from any of 5 units

**For Section B :** Three questions can be taken from any of the 5 units.

**CORE PAPER-VII**  
**PAPER TITLE: PROGRAMMING IN JAVA**

<b>SUBJECT CODE :17UCSCC07</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: IV</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVES:**

- To understand the importance of Classes & objects, in-built packages and thread.
- To provide knowledge in Applet programming and awt class

**UNIT I: (18 Hours)**

Introduction to Java – Object Oriented Concepts – Java Tokens- Java Statements – Constants – Variables - Data Types - Type Casting – Operators – Expressions -Control Statements: Branching and Looping Statements.

**UNIT II: (18 Hours)**

Classes – Objects – Methods - Constructors – Overloading methods – Inheritance – Overriding methods – Finalizer and Abstract Methods-Visibility Control- Arrays– String Class — String Arrays – String Methods - String Buffer Class.

**UNIT III: (18 Hours)**

**Interfaces:** Defining Interfaces-Extending Interfaces-Implementing Interfaces-Accessing Interfaces- Packages: Creating Packages- Accessing Packages – Importing Packages – Exception Handling throw and throws – Thread: Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization-Implementing the Runnable Interface.

**UNIT IV: (18 Hours)**

**Input / Output Files:** Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes –Using the File Class-Creation of Files- Applet Programming: Applet Life Cycle –Java Utilities: Random Class, Vector Class.

**UNIT V: (18 Hours)**

**Introducing the AWT:** Working with Windows, Graphics: Drawing Lines, Drawing Rectangles, Drawing Ellipses and Circles, Drawing arcs and Drawing Polygons- Working with Text- AWT Classes- Working with Frames- Working with Color-Working with Fonts-Using AWT Controls: Labels - Button-Check Box-Radio Button-Choice-List – Scrollbars, Layout Managers and Menus. Layout Managers: Flow Layout-Border Layout - Grid Layout - Card Layout - Grid bag Layout- Menus-Dialogs-Mouse Events and their Listeners.

**PRESCRIBED BOOKS:**

1. P. Naughton and H.Schildt - Java 2(The Complete Reference) – Third Edition TMH 1999.
2. Programming with Java, - A Primer – E.Balaguruswamy.

**REFERENCE BOOKS:**

1. Ken Arnold ,The Java Programming Language-Third Edition,Addison Wesley Longman ,2000
2. Ivan Bayross,HTMLJavascript, DHTML, and PHP,First Edition- 2015,Fourth Revised Edition: 2010
3. Sachin .B.Patil,FAQ's in Java, Mr.Purushothaman,2011 Scitech Publications(India) Pvt .ltd

4. Programming in Java – C.Muthu
5. Cay S. Horstmann, Gary Cornell – Paper Java 2 Volume I – Fundamentals, 5th Edition. PhI, 2000.
6. K.Arnold and J.Gosling – The Java Programming Language – Second Edition Addison Wesley, 1996.

**WEBSITES:**

1. <http://www.vogella.com/tutorials/JavaIntroduction/article.html>
2. [http://www.math.hcmuns.edu.vn/~hvthao/courses/java\\_programming/lecture\\_notes/](http://www.math.hcmuns.edu.vn/~hvthao/courses/java_programming/lecture_notes/)

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 8	13-20	6	30
C	Answer any 4 out of 6	21-26	10	40
<b>TOTAL</b>		<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	NO. of Questions	
		Theory	Problems
Section A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
Section B	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	



**CORE PAPER-VIII**  
**PAPER TITLE: PROGRAMMING IN JAVA - PRACTICAL**

<b>SUBJECT CODE :17UCSCC08P</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: IV</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:60</b>

**COURSE OBJECTIVES:**

- To implement solutions to various I/O operations, Threads, Exceptions and String manipulations.
- To learn and practice applet programming and awt class to develop GUI based programming.

**APPLICATION**

**(40 Hours)**

1. Calculate Simple and Compound Interest
2. Largest of 3 numbers
3. To illustrate class and object
4. Factorial using recursion
5. To illustrate constructors
6. Method overloading
7. To illustrate inheritance
8. Method overriding
9. To illustrate Thread
10. To illustrate Exception handling

**APPLET**

**(20 Hours)**

11. Generate various shapes using Applet
12. Point class manipulation
13. Draw a Human face
14. Program to create Checkbox, choice, Radio Button, Label and Text Box
15. Change Font and Color

**ALLIED PAPER-IV**  
**PAPER TITLE: STATISTICAL METHODS AND THEIR APPLICATIONS**  
**(For B.Sc. Computer Science)**

<b>SUBJECT CODE: 16UMATA25</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: IV</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To introduce basic concepts of Statistics and computing statistical aspects

**UNIT I: (18 Hours)**

Measures of location – Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean, and their properties, Merits and demerits -Diagrammatic and Graphical Representation of Data - Measures of Dispersion -- Range, Mean Deviation, Quartile Deviation, Standard deviation, Coefficient of variation, Skewness and Kurtosis and their properties.

Chapter 4, Section 4.1 to 4.4,

Chapter 5, Section 5.1 to 5.8

Chapter 6, Section 6.1 to 6.4

Chapter 7, 7.1 and 7.2

**UNIT II: (18 Hours)**

Probability of an Event – Addition and Multiplication theorems – Independent Events – Conditional Probability – Baye's theorem.

Chapter 8, Section 8.1 to 8.9

**UNIT III: (18 Hours)**

Correlation and Regression Lines – Rank Correlation Coefficient – Curve fitting by the Method of Least Squares.

Chapter 13, Section 13.1 to 13.2

**UNIT IV: (18 Hours)**

Concept of Sampling Distributions – Standard Error – Test of Significance based on t, Chi-Square and F-distributions with respect to Mean and Variance – Test of Independence in Contingency table.

Chapter 24, Section 24.1, 24.2

Chapter 26, Section 26.1, 26.2, 26.3

Chapter 27

Chapter 28

**UNIT V: (18 Hours)**

Principle of Scientific Experiments – Randomization, Replication and Local Control. Analysis of Variance – One way and Two Way Classification – Analysis of CRD, RBD – Latin Square Designs.

Chapter 29, Section 29.1 to 29.9

Content and treatment as in

Statistical and Numerical Methods by P.R.Vittal and V.Malini

**PRESCRIBED BOOKS:**

1.P.R.Vittal & V.Malini, Statistical and Numerical methods, Margham Publications.

2.Snedecor, G.W., & Cochran, W.G.(1967): Statistical Methods, Oxford and IBH

3. Prentice Hall 4. Statistical Methods - Dr. S.P. Gupta - Sultan Chand & Sons

**REFERENCE BOOKS:**

1. Fundamental of Mathematical Statistics - S.C. Gupta & V.K. Kapoor - Sultan Chand
2. Wilks, S.S.: Elementary Statistical Analysis - Oxford and IBH
3. Mode, E.B.: Elements of Statistics - Prentice Hall

**WEBSITES:**

1. [www.e-booksdirectory.com](http://www.e-booksdirectory.com)
2. [www.bookboon.com/en/statistics-and-mathematics-ebooks](http://www.bookboon.com/en/statistics-and-mathematics-ebooks)
3. [www.freebookcentre.net](http://www.freebookcentre.net)

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
<b>Section A</b>	<b>Definition / Principles</b> Answer any 10 questions out of 12	1 – 12	3	<b>30</b>
<b>Section B</b>	<b>Short Answer</b> Answer any 5 questions out of 7	13-19	6	<b>30</b>
<b>Section C</b>	<b>Essay</b> Answer any 4 questions out of 6	20-25	10	<b>40</b>
	<b>TOTAL</b>			<b>100</b>

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	No. of Questions	
		Theory	Problems
<b>Section A</b>	Unit – 1		3
	Unit – 2	1	1
	Unit – 3	1	2
	Unit – 4	1	1
	Unit – 5	1	1
<b>Section B</b>	Unit – 1		1
	Unit – 2		1
	Unit – 3		2
	Unit – 4		2
	Unit – 5		1
<b>Section C</b>	Unit – 1		2
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1
	Unit - 5		1

**ALLIED PAPER-IV**  
**PAPER TITLE: STATISTICAL METHODS AND THEIR APPLICATIONS PRACTICAL**

<b>SUBJECT CODE: 16UMATA26P</b>	<b>PRACTICALS</b>	<b>MARKS 100</b>
<b>SEMESTER: IV</b>	<b>CREDITS: -</b>	<b>TOTAL HOURS:30</b>

**COURSE OBJECTIVES:**

1. Construction of univariate and bivariate frequency distribution with samples of size not proceeding 200.
2. Diagrammatic and graphical representation of various statistical data and frequency distributions.
3. Cumulative frequency curve and Lorenz curves.
4. Computation of various measures of location, dispersion, moments, skewness and kurtosis.
5. Curve fitting by the method of least squares.  
 (i)  $y = ax + b$ ; (ii)  $y = ax^2 + bx + C$ ; (iii)  $y = ae^{bx}$  (iv)  $y = ax^b$
6. Computation of correlation coefficients - regression lines (raw data and grouped data) – correlation coefficients,
7. Exact test based on t, Chi-square, and F distributions with regard to mean, variance and correlation coefficients.
8. Analysis of variance – one way and two way classification, CRD, RBD

Content and treatment as in  
 Statistical and Numerical Methods by P.R.Vittal and V. Malini

**PRESCRIBED BOOKS & REFERENCE BOOKS:**

1. Mode, E.B.: Elements of Statistics - Prentice Hall
2. Wilks, S.S.: Elementary Statistical Analysis -Oxford and IBH
3. Snedecor, G.W., & Cochran, W.G.: Statistical Methods, Oxford and IBH
4. Simpson and Kafka: Basic Statistics
5. Burr, I.W.: Applied Statistical Methods, Academic Press.
6. Croxton, FE. and Cowden, D.J.: Applied General Statistics, Prentice Hall
7. Ostleo, B.: Statistics in Research, Oxford & IBH.
8. Sydney Siegel- Non-parametric Methods for Behavioural Sciences.
9. Daniel, W W- Biostatistics.

**PRESCRIBED BOOKS:**

1. Statistical methods and their applications by P.R.Vittal

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
Section A	Definition / Principles Answer all the questions (each in 50 words)	1 –6		

**SKILL BASED SUBJECT**  
**PAPER TITLE: QUANTITATIVE APTITUDE**

<b>SUBJECT CODE: 16UGSLS05</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: IV</b>	<b>CREDITS: 3</b>	<b>TOTAL HOURS: 30</b>

**COURSE OBJECTIVES:**

- To improve aptitude skill.

**UNIT-I:**

**(6 Hours)**

Divisibility – HCF and LCM – Decimal Fractions – Square roots and Cube Roots – Logarithms – Antilogarithms.

**UNIT-II:**

**(6 Hours)**

Averages – Percentage – Profit and Loss - Ratio and Proposition – Partnership – Alligation and mixture.

**UNIT-III:**

**(6 Hours)**

Time and work – Pipes and Cistern – Time and Distance – Boats and Streams.

**UNIT-IV:**

**(6 Hours)**

Simple Interest – Compound Interest – Stocks and Shares – True Discount – Banker's discount.

**UNIT-V:**

**(6 Hours)**

Area – Volume and surface Areas – Heights and Distances – Data Interpretation: Tabulation – Bar Graphs – Pie Charts – Line Graphs.

**REFERENCE BOOKS:**

1. R.S. Aggarwal, Objective Arithmetic , S. Chand & Company, New Delhi , 2005
2. Govind Prasad Singh and Rakesh Kumar, Text Book of Quickest Mathematics (for all Competitive Examinations), KiranPrakashan, 2012
3. R.S. Aggarwal, Quantitative Aptitude, S. Chand & Company, New Delhi, 2012

**CORE PAPER-IX**  
**PAPER TITLE: OPERATING SYSTEMS**

<b>SUBJECT CODE :16UCSCC09</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To have an in-depth understanding of process concepts, scheduling algorithms, deadlock and memory management.
- Students will familiarize on the general structure of an operating system and case study is also provided.

**UNIT I: (18 Hours)**

Introduction: Views –Goals – OS Structure –Components – Services - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process – Threads - Interprocess Communication.

**UNIT II: (18 Hours)**

CPU Scheduling: CPU Schedulers – Scheduling criteria – Scheduling Algorithms - Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region.

**UNIT III: (18 Hours)**

Deadlock: Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock. Secondary Storage Structures: Protection – Goals-Domain Access matrix.

**UNIT IV: (18 Hours)**

Memory Management: Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation. Non Contiguous Allocation: Paging and Segmentation schemes –Implementation – Sharing - Fragmentation.

**UNIT V: (18 Hours)**

Virtual Memory: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure –Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management.

**PRESCRIBED BOOKS:**

1. Silberschatz A., Galvin P.B., Gange,,2002 , Operating System Principles, Sixth Edition, John Wiley & Sons.

**REFERENCE BOOKS:**

1. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition, Addison Wesley

**WEBSITES:**

1. <http://www.ics.uci.edu/~ics143/lectures.html>
2. <http://williamstallings.com/Extras/OS-Notes/notes.html>

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 8	13-20	6	30
C	Answer any 4 out of 6	21-26	10	40
<b>TOTAL</b>		<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	NO. of Questions	
		Theory	Problems
Section A	Unit – 1	2	
	Unit – 2	3	
	Unit – 3	3	
	Unit – 4	2	
	Unit – 5	2	
Section B	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER- X**  
**PAPER TITLE: DIGITAL LOGIC AND COMPUTER ARCHITECTURE**

<b>SUBJECT CODE :17UCSCC10</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To understand the design of the various functional units and components of computers.
- To understand different types of addressing modes and memory organization.

**UNIT I:**

**(18 Hours)**

Binary Systems & Code conversion, Boolean Algebra & Logic Gates – Truth Tables – Universal Gates – Simplification of Boolean functions: K-map, – Combinational Logic: Adders & Subtractors.

**UNIT II:**

**(18 Hours)**

Multiplexer – Demultiplexer - Sequential Logic: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops – Shift Registers – Types of Shift Registers.

**UNIT III:**

**(18 Hours)**

Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

**UNIT IV:**

**(18 Hours)**

Central Processing Unit: Register organization arithmetic and logical micro-operations, stack organization, micro programmed control codes, machine language, assembly language, input output programming.

**UNIT V:**

**(18 Hours)**

Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

**PRESCRIBED BOOKS:**

1. M. Morris Mano,2005, Digital Logic and Computer Design, Prentice-Hall of India Pvt. Ltd.
2. M. Mano, Computer System Architecture, Pearson Education 1992.

**REFERENCE BOOKS:**

1. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
2. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India,2009
3. V. Vijayendran,2004, Digital Fundamentals, S. Viswanathan (Printers & Publishers) Pvt. Ltd.



**QUESTION PAPER PATTERN:**

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	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER- XI**  
**PAPER TITLE: VISUAL PROGRAMMING AND DATABASE MANAGEMENT SYSTEMS**

<b>SUBJECT CODE :17UCSCC11</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVES:**

- To impart UI design and access to back end using various VB objects.
- To emphasize the significance of Database Design and Normalization and to familiarize the concepts of Transaction Processing, Concurrency Control, Query Processing and Optimization.

**UNIT I: (18 Hours)**

**INTRODUCTION TO VB:** Need to Visual Basic – The Visual Basic Environment – First steps in programming – Visual Basic Editing tools – Data Types – Comments – Variables – Strings – Constants – Input Boxes - Customizing a form and writing simple program: Starting a new project – The property window – The common form properties – Creating stand-alone windows program.

**UNIT II: (18 Hours)**

Building user interface – The Tool box – Creating Controls – Simple event procedures – Message Box – The Grid - Controlling program flow: Determinate loops – indeterminate loops – making decisions – select case – nested if-then – The goto – Built-in-functions – String functions – Numeric functions – Date and Time functions – RND function – procedures and functions.

**UNIT III: (18 Hours)**

**ORGANIZING INFORMATION VIA CODE:** Lists – one dimensional array – organizing information via controls: Control arrays – list and combo boxes - Building larger projects: The projects with multiple forms – Do Events functions and sub-main.

**INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS:** Introduction – Databases and Application Development – **Components of Database Management System:** Database Engine – Data Dictionary – Query Processor – Report Writer – Forms Generator – Application Generator – Communication and Integration – Security and other Utilities. **Advantages of the DBMS Approach:** Focus on Data – Data Independence - Data Independence and Client/Server Systems. Brief history of DBMS: Hierarchical – Network - Relational and Object-Oriented Databases. The Feasibility Study: Costs – Benefits.

**UNIT IV: (18 Hours)**

**DATABASE DESIGN AND DATA NORMALIZATION:**

**DATABASE DESIGN:** Introduction – Identifying user requirements – Business objects – Tables and Relationships – Definitions – Primary key. **Class Diagrams:** Classes and Entities – Associations and Relationships – Class Diagram Details. **Datatypes (Domains/Objects):** Text – Numbers – Dates and Times – Binary Objects – Computed Values – User-Defined Types – Events. **Data Normalization:** Introduction – Tables, Classes and Keys – Relational Database – Primary Key – Composite Keys - Surrogate Keys – Sample Database for a Video Store – First Normal Form: Repeating groups – Nested Repeating groups. Second Normal Form: Problems with 1NF – 2NF Definition – Dependence. Third Normal Form: Problems with 2NF – Definition – Checking work with Non – Redundancy. Beyond 3NF: Boyce-Codd Normal Form – Fourth Normal Form – Domain-Key Normal Form. Data Rules and Integrity – Converting a class diagrams to Normalized

tables: one-to-many, Many-to-many, N-ary Associations, Generalization, Composition, Reflexive associations. Data Dictionary: DBMS Table Definition – Data Volume and Usage.

**UNIT V:**

**(18 Hours)**

**QUERIES AND SUB QUERIES:**

**DATA QUERIES:** Introduction – Three Tasks of a Query Language – Four Questions to Retrieve data – Query Basics: Single Tables – Introduction to SQL – Sorting Output – Distinct – Criteria – Boolean Algebra – DeMorgan’s Law – WHERE Clauses. Computations: Basic Arithmetic Operators – Aggregation – Functions. Subtotals and GROUPBY: HAVING (Conditions on totals) – WHERE versus HAVING. Multiple Tables: Joining Tables – Identifying Columns in Different tables – Joining many tables – Table Alias – Create View.

**ADVANCED QUERIES AND SUB QUERIES:** Introduction – Sub Queries: Calculations – Sub queries and sets of data – Subquery with ANY and ALL – Subtraction: NOT IN – OUTER JOINS – SQL SELECT, UNION, INTERSECT, EXCEPT – Multiple JOIN columns – Reflexive Join CASE Function – Inequality Joins – Questions with “Every” need the EXISTS – Clause – SQL Data Definition Commands – SQL Data Manipulation Commands: INSERT, DELETE, UPDATE – Quality: Testing Queries.

**PRESCRIBED BOOKS**

1. Gary Cornell, “Visual Basic 6” Tata McGraw Hill Publishing.
2. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

**REFERENCE BOOKS**

1. Byron S. Gottfried – Visual Basic - Schaum’s Outlines – McGraw hill Edition 2002.
2. N.Krishnan, Visual Basic 6.0 in 30 days, V.Ramesh, 2000
3. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
4. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
5. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.
6. Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.

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	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER- XII**  
**PAPER TITLE: VISUAL PROGRAMMING - PRACTICAL**

<b>SUBJECT CODE :17UCSCC12P</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVES:**

- To understand database concepts of data structures and query language.
- To design and build a simple database system and to implement with the fundamental tasks involved with modeling, designing, and implementing a DBMS

**(45 Hours)**

1. Write a program to convert Roman numerals to decimal.
2. Write a program to do money conversion. (Conversion of rupees to various currencies).
3. Write a program to design a calculator with arithmetic, sqrt and trigonometric functions.
4. Write a program to perform temperature conversion and inches to feet conversion. The program should include facility to change font size, to display with precision (decimal places). The program should use MDI forms.
5. Write a program to select items form one list and move them to another list.
6. Write a program to implement the timer and shape controls.
7. Write a program to drag and drop an image from one image box to another.
8. Write a program to implement the slider control to change the font size of a text box
9. Write a program to create a sketchpad using picture box.

**(45 Hours)**

For the following programs use MS-Access, create a database and perform the operations given below:

Use a Menu Driven Program:

- (i) Insertion
- (ii) Deletion
- (iii) Modification
- (iv) Generate simple reports using queries.

10. Telephone directory maintenance.
11. Payroll.
12. Invoice System.
13. Mark sheet Processing.
14. Inventory System.
15. Library information system

**ELECTIVE-I**  
**PAPER TITLE: LINUX PROGRAMMING PRACTICAL**

<b>SUBJECT CODE :17UCSCE01P</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS:75</b>

**COURSE OBJECTIVES:**

- To acquire Knowledge of Linux files system/file handling, command line interpreter
- To understand basic Linux commands and apply various filters and pipes

**UNIT I: (15 Hours)**

Introduction to Linux operating system- features of Linux, basic architecture of Linux system, features of kernel and shell.

**UNIT II: (15 Hours)**

Structure of file system, creating and viewing files using cat, cd, ls, cp, md, rm, mkdir, rmdir, pwd, more, less, file comparisons – cmp and comm., view files, disk related commands, checking disk free spaces, chmod with its options, cal, date, who, tty, lp, stty.

**UNIT III: (15 Hours)**

Filters and pipes: head, tail, wc, pr, cut, paste, sort, unique, grep, egrep, fgrep, tee. The process: shell process, parent and children, process status, changing process priority with nice, premature termination of process, mathematical commands – bc, expr, factor, units.

**UNIT IV: (15 Hours)**

Creating and editing files with VI editor with their command options, Operators, Text deletion, Text movement, changing text, yanking text, filtering text, the ex mode, moving text from one file to another. Communication: the bulletin board – news, write, msg, talk, mail, elm, pine, finger, vacation.

**UNIT V: (15 Hours)**

Shell Programming- Introduction to Shell - Set and Unset a variable - Displaying –echo - Expr - Test - Getting input –using read - Conditional & Looping Statement : if statement - if –else statement - Nested if statement - ‘While’ Loop - ‘Until’ Loop - ‘For’ Loop – CASE

**PRESCRIBED BOOKS**

1. Unix concepts and application – Sumitabha Das – Tata Mcgraw Hill.

**REFERENCE BOOKS**

1. Unix – Syed Mansoor Sarwar, Robert Kortskey – Pearson education.
2. Using Linux – David Bandel and napier – Pearson Education.

## PRACTICALS

**(2 Hours)**

1. a) Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.  
b) Usage of following commands: cat(append), cat(concatenate), mv, cp, man, date.
2. a) Usage of following commands: chmod.  
b) Usage of following commands: head, tail, wc, pr, cut, paste, sort, unique,
3. Usage of following commands grep, egrep, fgrep, tee. **(2 Hours)**
4. Usage of following commands: process status, changing process priority with nice.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to check if the number entered at the command line is prime or not. **(2 Hours)**
7. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of “who” command along with the total number of users.
10. Write a shell script to display the multiplication table for a given number. **(2 Hours)**
11. Write a shell script to compare two files and if found equal, ask the choice from the user to delete the duplicate file and delete the file.
12. Write a shell script to find the sum of digits of a given number. **(9 Hours)**
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the factorial of a given number.
15. Write a shell script to check whether the number is Armstrong or not.

**ELECTIVE I**  
**PAPER TITLE: PYTHON PROGRAMMING – PRACTICAL**

<b>SUBJECT CODE: 17UCSCE04</b>	<b>PRACTICAL</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS:75</b>

**COURSE OBJECTIVES:**

- To introduce object-oriented programming using an easy-to-use language.
- To use iterators and generators, lists, tuples, and dictionaries in Python programs

**UNIT I:**

**(12 Hours)**

Overview of Programming: Structure of a Python Program, Elements of Python  
Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator)

**UNIT II:**

**(12 Hours)**

Creating Python Programs: Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, default arguments, Errors and Exceptions.

**UNIT III:**

**(12 Hours)**

Tables, Two-dimensional tables, Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, string built-in methods – set

**UNIT IV:**

**(12 Hours)**

Dictionary – file operation- List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion

**UNIT V:**

**(12 Hours)**

Tuple operators and built-in functions – features of tuples. Regular expressions and Python: - Introduction – special symbols and characters for regular expressions.

**PRESCRIBED BOOKS**

1. Python programming for absolute beginner, 3<sup>rd</sup> edition, Michael Dawson.
2. Chun, J Wesley, CORE Python programming, 2<sup>nd</sup> edition, Pearson, 2010.

**REFERENCE BOOKS**

1. Jeffrey Elkner, Chris Meyers Allen Downey, learning with python, Dreamtech press, 2015.



## **PRACTICALS**

**(15 Hours)**

1. Write a Python program to demonstrate arithmetic operations.
2. Write a Python program to calculate electricity bill for each slab using if statement.
3. Write a Python program to generate first n prime numbers using for loop
4. Write a Python program
  - a. to get the number of occurrences of a specified element in an array.
  - b. to remove the first occurrence of a specified element from an array.
  - c. to insert a new item before the second element in an existing array.
  - d. to remove a specified item using the index from an array.
5. Write a Python program to calculate the GCD of two numbers using recursion.
6. Write a Python program to find average of numbers using List
7. Write a Python program to illustrate Dictionary object
8. Write a Python program for implementation of Bubble Sort.
9. Write a Python program to demonstrate string manipulation.
10. Write a Python program using tuples.
11. Write a Python program to demonstrate the use of regular expressions.
12. Write a Python program to demonstrate exception handling.

**PAPER TITLE:VALUE EDUCATION**

<b>SUBJECT CODE: 16UVED401</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 2</b>	<b>TOTAL HOURS: 15</b>

**COURSE OBJECTIVES:**

Values are socially accepted norms to evaluate objects, persons, and situations that form part and parcel of sociality. A value system is a set of consistent values and measures. Knowledge of the values are inculcated through education. It contributes in forming true human being, who are able to face life and make it meaningful. There are different kinds of values like, ethical or moral values, doctrinal or ideological values, social values and aesthetic values. Values can be defined as broad preferences concerning appropriate courses of action or outcomes. As such, values reflect a person's sense of right and wrong or what "ought" to be. There are representative values like, "Equal rights for all", "Excellence deserves admiration". "People should be treated with respect and dignity". Values tend to influence attitudes and behavior and help to solve common human problems. Values are related to the norms of a culture.

**UNIT I:**

**(3 Hours)**

Value education-its purpose and significance in the present world – Value system – The role of culture and civilization-Holistic living – Balancing the outer and inner – Body, Mind and Intellectual level- Duties and responsibilities.

**UNIT II:**

**(3 Hours)**

Salient values for life- Truth, commitment, honesty and integrity, forgiveness and love, empathy and ability to sacrifice, care, unity, and inclusiveness, Self-esteem and self-confidence, punctuality – Time, task and resource management – Problem solving and decision making skills- Interpersonal and Intra personal relationship – Team work – Positive and creative thinking

**UNIT III:**

**(3 Hours)**

Human Rights – Universal Declaration of Human Rights – Human Rights violations – National Integration – Peace and non-violence – Dr. A P J Kalam's ten points for enlightened citizenship – Social Values and Welfare of the citizen – The role of media in value building.

**UNIT IV:**

**(3 Hours)**

Environment and Ecological balance – interdependence of all beings – living and non-living. The binding of man and nature – Environment conservation and enrichment.

**UNIT V:**

**(3 Hours)**

Social Evils – Corruption, Cybercrime, Terrorism – Alcoholism, Drug addiction – Dowry – Domestic violence – untouchability – female infanticide – atrocities against women How to tackle them.

**REFERENCE BOOKS:**

1. M.G.Chitakra: Education and Human Values, A.P.H.Publishing Corporation, New Delhi, 2003
2. Chakravarthy, S.K. : Values and ethics for Organizations: Theory and Practice, Oxford University Press, New Delhi , 1999.
3. Satchidananda, M.K.: Ethics, Education, Indian Unity and Culture, Ajantha Publications, Delhi, 1991
4. Das, M.S. & Gupta, V.K. : Social Values among Young adults: A changing Scenario, M.D. Publications, New Delhi, 1995

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	Unit – 4	2	
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**CORE PAPER-XIII**  
**PAPER TITLE: DATA COMMUNICATION AND NETWORKING**

<b>SUBJECT CODE :17UCSCC13</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: VI</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVES:**

- Demonstrate understanding about various data communication transmission media, interface and Modulation techniques.
- To understand the various protocols, topologies, layers and configurations.

**UNIT I: (18 Hours)**

Introduction to Data Communication, Network, Protocols and Standards - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.

**UNIT II: (18 Hours)**

Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.

**UNIT III: (18 Hours)**

Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet - Token Bus - Token Ring - FDDI - IEEE 802.6 - SMDS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.

**UNIT IV: (18 Hours)**

Repeaters - Bridges - Routers - Gateway - Routing algorithms: Distance Vector, link State, path vector Routing, Multicast Routing - TCP/IP Network, Transport Layer of TCP/IP: TCP, TCP Services, TCP Features - Application Layers of TCP/IP: Namespace, DNS, Distribution of Namespace, Dns in the Internet, Resolution , DNS messages, Types of Records, Registers, Dynamics DNS, Encapsulation- World Wide Web: Architecture, Client, Server, URL, Cookies. Web document: Static Document, Dynamic Document, active Document.

**UNIT V: (18 Hours)**

Computer Security Concepts-Security Attacks: Active Attacks, Passive Attacks -Message authentication Codes: message Authentication Requirements, Message Authentication Functions Requirements for message Authentication codes-Electronic mail Security: s/MIME, Domain Keys Identified Mail- IP Security: IP Security Overview, IP Security Policy, Encapsulating Security payload, Combining Security Associations, Internet key Exchange, Cryptographic suits- Firewalls: The Need for Firewalls, Firewall Characteristics, Types of Firewalls, Firewalls Basing, Firewall Location and Configuration.

**PRESCRIBED BOOKS**

1. Behrouz and Forouzan, 2001, Introduction to Data Communication and Networking, 2<sup>nd</sup> Edition, TMH.
2. William Stallings, Cryptography and Network Security -5 th Edition, PHI, 2009.
3. Cryptography and Network Security (UPTU), V.S.Bagad, I.A.Dhotre, Technical Publications.

## REFERENCE BOOKS

1. Jean Walrand 1998, Communication Networks (A first Course), Second Edition, WCB/McGraw Hill.
2. Behrouz and Forouzan, 2006, Data Communication and Networking, 3rd Edition, TMH.
3. Bruce, Schneider, Applied Cryptography, 2nd Edition, Toha Wiley & Sons, 1996.
4. Dougals R. Stinson, Cryptography- Theory and Practice, CRC Press, 1995

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	Unit – 4	1	
	Unit - 5	1	

**CORE PAPER-XIV**  
**PAPER TITLE: WEB PROGRAMMING WITH PHP AND MYSQL**

<b>SUBJECT CODE :17UCSCC14</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: VI</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVES:**

- Creating, Reading and writing cookies, sessions.\
- Learn different ways of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL Server and other data sources

**UNIT-I: (18 Hours)**

**INTRODUCTION**

Introduction- open source - PHP — history- features -variables- statements- operators -conditional statements - if – switch - nesting conditions - merging forms with conditional statements - loops - while -do – for loop iteration with break and continue.

**UNIT-II: (18 Hours)**

**ARRAYS AND FUNCTIONS**

Arrays: Creating an array- modifying array - processing array – grouping form with arrays - using array functions - creating user defined functions - using files

**UNIT-III: (18 Hours)**

Sessions – cookies – executing external programs – creating sample applications using PHP.

**My SQL:**

Effectiveness of MYSQL – MYSQL Tools – Pre-requisites for MYSQL connection – Databases and tables – MYSQL data types

**UNIT-IV: (18 Hours)**

Creating and manipulating tables – Insertion, Updation and Deletion of rows in tables – Retrieving data - Sorting and Filtering retrieved data – Advanced data filtering - Data Manipulation functions – Aggregate functions – Grouping data – Sub Queries – Joining Tables – Set Operators – Full text searching.

**UNIT-V: (18 Hours)**

**PHP with MYSQL**

Working MYSQL with PHP – Database Connectivity – usage of MYSQL with PHP commands, processing result sets of queries – handling errors – debugging and diagnostic functions – Validating user input through Database layer and Application layer – formatting query output with Character, Numeric, Date and Time – sample Database Applications.

**PRESCRIBED BOOKS:**

1. VIKRAM VASWANI, "PHP and MySQL", Tata McGraw-Hill, 2005
2. BEN FORTA, "MySQL Crash course" SAMS, 2006.
3. C.J.DATE, "An Introduction to Database Systems", Addison Wesley, Sixth Edition.
4. Ramesh Elmasri and Shamkant B.Navathe, "fundamentals of Database Systems", Pearson Education, Thrid Edition.

**REFERENCE BOOKS:**

1. Tim Converse, Joyce Park and Clark Morgan, "PHP 5 and MySQL", Wiley India reprint, 2008.
2. Robert Sheldon, Geoff Moes, "Beginning MySQL", Wrox, 2005.
3. Alexis Leon and Mathews Leon, "Database Management Systems", Vikas, 2008.

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	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	2	
	Unit – 5	2	
Section C	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	2	
	Unit - 5	1	

## **CORE PAPER-XV**

### **PAPER TITLE: WEB PROGRAMMING WITH PHP AND MYSQL - PRACTICAL**

<b>SUBJECT CODE :17UCSCC15P</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: V</b>	<b>CREDITS: 4</b>	<b>TOTAL HOURS: 90</b>

#### **COURSE OBJECTIVES:**

- Understand how server-side programming works on the web using PHP scripts.
- How MySQL can be used with programming languages like PHP to create dynamic websites for visitors

#### Creating simple webpage using PHP

1. Use of conditional statements in PHP
2. Use of looping statements in PHP
3. Creating different types of arrays
4. File manipulation using PHP
5. Creation of sessions
6. Creation of cookies
7. Creating simple applications using PHP with input validations
8. Creating simple table with constraints
9. Insertion, Updating and Deletion of rows in MYSQL
10. Searching of data by different criteria
11. Sorting of data
12. Demonstration of joining tables
13. Usage of aggregate functions
14. Database connectivity in PHP with MYSQL



**ELECTIVE II**  
**PAPER TITLE: SOFTWARE ENGINEERING**

<b>SUBJECT CODE :16UCSCE02</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: VI</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS: 90</b>

**COURSE OBJECTIVES:**

- To impart knowledge of basic Software engineering methods and practices
- A general understanding of software development models such as the waterfall and cost estimation techniques, design, implementation and maintenance of software products.

**UNIT I: (18 Hours)**

Introduction to Software Engineering Some definition – Some size factors – Quality and productivity factors – Managerial issue. Planning a Software Project: Defining the problem – Developing a solution strategy – planning the development process – planning an organization structure – other planning activities.

**UNIT II: (18 Hours)**

Software Cost Estimation: Software – Cost factors – Software cost estimation techniques – specification techniques – level estimation – estimating software maintenance costs. The software requirements specification – formal specification techniques - languages and processors for requirements specification.

**UNIT III: (18 Hours)**

Software Design: Fundamental Design concepts – Modules and modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection.

**UNIT IV: (18 Hours)**

Implementation issues: Structured Coding techniques – coding style – standards and guidelines – documentation guidelines – type checking – scoping rules – concurrency mechanisms.

**UNIT V: (18 Hours)**

Quality assurance – walk through and inspection - Static analysis – symbolic exception – Unit testing and Debugging – System testing – Formal verification: Enhancing maintainability during development – Managerial aspects of software maintenance – Configuration management – source code metrics – other maintenance tools and techniques.

**PRESCRIBED BOOKS:**

1. Richard E.Fairly - Software Engineering Concepts - Tata McGraw-Hill book Company.

**REFERENCE BOOKS:**

1. Richard E.Fairley,Software Engineering Concepts,McGraw-Hill,1985
2. Ian Sommerville,Software Engineering-9<sup>th</sup> Edition,Darling Kindersley,2011
3. Roger S.Pressman,Software Engineering A Practitioner's Approach-6<sup>th</sup> Edition, McGraw-Hill,2005
4. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.
5. RajibMall ,2004,Fundamentals of Software Engineering,2<sup>nd</sup> Edition, PHI.

**WEBSITES:**

1. <http://people.cs.missouri.edu/~duanye/cs4320/lectures.htm>
2. <http://iiscs.wssu.edu/drupal/node/4566>

**QUESTION PAPER PATTERN:**

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	3	30
B	Answer any 5 out of 8	13-20	6	30
C	Answer any 4 out of 6	21-26	10	40
<b>TOTAL MARKS</b>		<b>100</b>		

**DISTRIBUTION OF QUESTIONS:**

Sections	Units	NO. of Questions	
		Theory	Problems
Section A	Unit – 1	3	
	Unit – 2	3	
	Unit – 3	2	
	Unit – 4	2	
	Unit – 5	2	
Section B	Unit – 1	2	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	2	

**ELECTIVE II**  
**PAPER TITLE: DATA MINING**

<b>SUBJECT CODE: 17UCSCE03</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: VI</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To clean data and to check for missing data
- To understand the concept of clustering and classification

**UNIT I:**

Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing: Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction

**UNIT II:**

Data Mining, Primitives, Languages and System Architecture:  
Data Mining – Primitives – Data Mining Query Language,. Architectures of Data mining Systems. Concept Description, Characterization and Comparison: Concept Description, Data Generalization and Summarization, Analytical Characterization, Mining Class Comparison – Statistical Measures.

**UNIT III:**

Mining Association Rules: Basics Concepts – Single Dimensional Boolean Association Rules from Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

**UNIT IV:**

Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy.

**UNIT V:**

Cluster Analysis: Introduction – Types of Data in Cluster Analysis, Partitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method.

**PRESCRIBED BOOKS:**

1. J.Han and M. Kamber,2001,Data Mining Concepts and Techniques,Harcourt India Pvt. Ltd - New Delhi.

**REFERENCE BOOK:**

1 K.P. Soman , Shyam Diwakar, V.Ajay ,2006, Insight into Data Mining Theory and Practice, Prentice Hall of India Pvt. Ltd - New Delhi.

**WEBSITES**

1. [http:// www.academicpress.com](http://www.academicpress.com)
2. <http://www.mkp.com>

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	Unit – 2	1	
	Unit – 3	2	
	Unit – 4	1	
	Unit – 5	1	
<b>Section C</b>	Unit – 1	1	
	Unit – 2	2	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	1	

**ELECTIVE II**  
**PAPER TITLE: SOFTWARE TESTING**

<b>SUBJECT CODE: 16UCSCE04</b>	<b>THEORY</b>	<b>MARKS 100</b>
<b>SEMESTER: VI</b>	<b>CREDITS: 5</b>	<b>TOTAL HOURS:90</b>

**COURSE OBJECTIVES:**

- To test the work products such as requirements, design and code.
- To validate if the test object is complete and works as per the expectation of the user.

**UNIT I:** (18 Hours)  
Principles of Testing – Software Development Life Cycle Models.

**UNIT II:** (18 Hours)  
White Box Testing – Black Box testing – Integration Testing.

**UNIT III:** (18 Hours)  
System and Acceptance Testing – Performance Testing – Regression Testing.

**UNIT IV:** (18 Hours)  
Testing Object-Oriented Systems – Usability and Accessibility Testing Organization structures for Testing Teams.

**UNIT V:** (18 Hours)  
Test Planning, Management, Execution, and Reporting – Software Test Automation – Test Metrics and Measurements.

**PRESCRIBED BOOKS:**

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

**REFERENCE BOOKS:**

1. Software Testing Technique-Beizer Boris, Dreamtech.

**WEBSITES:**

1. <http://www.inf.ed.ac.uk/teaching/courses/st/2011-12/Resource-folder/>

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