GURU NANAKCOLLEGE (Autonomous)

VELACHERY ROAD, CHENNAI –600042

(Re-Accredited 'A' grade by NAAC)

BACHELOR OF SCIENCE

DEPARTMENTOF COMPUTER SCIENCE

(SEMESTER SYSTEM WITH CREDITS)

Regulations & Syllabus

2017 – 2020 BATCH

APPENDIX – 11 (R & S)
UNIVERSITY OF MADRAS
GURU NANAK COLLEGE (AUTONOMOUS)

B.Sc., DEGREE PROGRAMME IN COMPUTER SCIENCE SEMESTER SYSTEM WITHCREDITS

(Effective from the Academic year 2017--20)

RULES ANDREGULATIONS

1. CHOICE BASED CREDIT SYSTEM (CBCS) WITHGRADING

The College follows the CBCS with grades under the semester pattern. Every course paper is provided with a credit point based on the quantum of subject matter, complexity of the content and the hours of teaching allotment. This is done after a thorough analysis of the content of each subject paper by the members of the Board of studies and with the approval of the Academic Council. Students are also offered with a choice of a variety of Job-oriented courses, Elective courses and courses involving Soft-skills. Students are permitted to choose any course of their interest during the study period and earn extra credits and certificates in addition to the regular hardcore (compulsory) subjects.
The evaluation method under CBCS involves a more acceptable grading system that reflects the personality of the student. This is represented as Cumulative Grade Point Average (CGPA) and Grade Point Average (GPA) which are indicators of Academic Performance of the student. It provides students scope for horizontal mobility as well as empowers them with the flexibility of learning at their convenience.

2. ELEGIBILITY FOR ADMISSION

Candidates for admission to the first year of the UG programme shall be required to have passed the higher secondary examinations (Academic or Vocational Stream) conducted by the Government of Tamil Nadu or an examination accepted as equivalent thereof by the Syndicate of the University of Madras. Students applying for the PG programme should have taken the UG degree in the concerned subject from a recognized university.

3. DURATION OF THECOURSE

The UG course is of three year duration with six semesters and the PG course is of two year duration with four semesters. The odd semester include the period from June to November and the even semester from December to April. There shall not be less than 90 working days for each semester.

4. COURSE OFSTUDY

The main subject of study for Bachelor's Degree shall consist of the following:

FOUNDATION COURSES:

PART – I Tamil or Classical Language (Hindi / Sanskrit/French)

PART – II English

CORE COURSES

PART – III consisting of (a) Main subjects, (b) Allied Subjects, (c) Elective subjects related to the main subject of study and project work.

PART–IV

(a) Those who have not studied Tamil up to XII standard, and taken a non-Tamil language under **Part – I** shall take Tamil comprising of Two courses (level will be at 6thstandard).

(b) Those who have studied Tamil up to XII standard, and taken a non—Tamil language under **Part –I** shall take **Advanced Tamil** comprising of two courses.

(c) Others who do not come under a or b can choose **non-major elective comprising of two courses.**

1. Soft Skills. (I , II, III &IV Semesters)
2. Environmental Studies (IV Semester)
3. Value Education (V Semester)

PART –V Compulsory Extension Service

A candidate shall be awarded one credit for compulsory extension service.

All the students shall enroll for **NSS / NCC / NSO (Sports & Games) Rotract/ Youth red cross or any other service organization** in the college and shall have to put in compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the college before **31stMarch in a year.** If a student LACKS **40 HOURS ATTENDANCE** in the first year, he / she shall have to compensate the same during the subsequent years. Literacy and population, educational field work shall be compulsory components in the above extension service activities.

5. COURSE STRUCTURE:

Sem. No.	Part No.	Course Component	Subject Name	Cdt	Hrs	CIA	ESE	Total
I	I	Language	Language – I	3	6	50	50	100
	II	English	English – I	3	4	50	50	100
	III	Core I	Problem solving using C programming	4	6	50	50	100
		Core II	Problem solving using C practical	4	4	50	50	100
		Allied I	Mathematics I	5	6	50	50	100
	IV	1. NME/ Basic Tamil	Office Automation Tools – Practical / Basic Tamil – I	2	2	50	50	100
		2. Skill based subjects	Soft Skill Elective I – Essentials of Language and Communication skill	3	2		100	100
II	I	Language	Language – II	3	6	50	50	100
	II	English	English – II	3	4	50	50	100
	III	Core III	Programming in C++	4	6	50	50	100
		Core IV	Programming in C++ - Lab	4	4	50	50	100
		Allied II	Mathematics II	5	6	50	50	100
	IV	1. NME/ Basic Tamil	HTML Lab – Practical / Basic Tamil –II	2	2	50	50	100
		2. Skill based subjects	Soft Skill Elective II – Essentials of Spoken and Presentation Skills	3	2		100	100
III	I	Language	Language – III	3	6	50	50	100
	II	English	English – III	3	4	50	50	100
	III	Core V	Analysis of Algorithms and Data Structures	4	6	50	50	100
		Core VI	Analysis Of Algorithms And Data Structures Using C++	4	6	50	50	100
		Allied III	Operations Research(syllabus changed)	5	6	50	50	100
	IV	Skill based subjects	Soft Skill Elective III – Personality Enrichment	3	2		100	100
IV	I	Language	Language – IV	3	6	50	50	100
	II	English	English – IV	3	6	50	50	100
	III	Core VII	Programming in JAVA	4	4	50	50	100
		Core VIII	Programming in Java- Practical	4	4	50	50	100
		Allied IV	Statistical Methods and their Applications	5	4	50	50	100
			Statistical Methods and their Applications - Practical	-	2	50	50	100
	IV	1. Skill based subjects	Soft Skill Elective IV – Quantitative Aptitude	3	2		100	100
		2. EVS	Environmental Studies	2	2	*	*	*
V	III	Core IX	Operating systems	4	6	50	50	100
		Core X	Digital Logic and Computer Architecture	4	6	50	50	100
		Core XI	Visual Programming and Database Management Systems	4	6	50	50	100
		Core XII	Visual Programming – Practical	4	6	50	50	100
		Elective – I	Interdisciplinary Elective – Internet and its applications	5	5	50	50	100
	IV	Skill based subjects	Soft Skill Elective V – Value Education	2	1	*	100	100
VI	III	Core XIII	Data Communication & Networking	4	6	50	50	100
		Core XIV	Web Programming with PHP and MySQL	4	6	50	50	100
		Core XV	Web Programming with PHP and MySQL - Practical	4	6	50	50	100
		Elective II	Software Engineering/Data Mining /Software Testing	5	6	50	50	100
		Elective III	Mini Project	5	6	50	50	100
	V	Extension Activities	Participation in NSS/NCC/ROTRACT etc.	1	-	-	-	-

GURU NANAK COLLEGE (AUTONOMOUS), CHENNAI – 600 042

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CORE I
PAPER TITLE: PROBLEM SOLVING USING C PROGRAMMING

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: I	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the basic concepts of programming in C

UNIT I : (15 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.

(20 Hours) 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: (19 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: (15 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.

PRESCRIBEDBOOKS :

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, 2nd Edition, PHI.
5. H. Schildt, C,2004, The Complete Reference, 4th 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/

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 II
PAPER TITLE: PROGRAMMING IN C PRACTICAL

SUBJECT CODE :	**PRACTICAL**	**100 MARKS**
SEMESTER: I	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 4**

COURSE OBJECTIVES: This course train the students to solve the problems using C language

(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 aprogram 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.

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

SUBJECT CODE :	THEORY	MAX. MARKS 100

SEMESTER: I

CREDITS: 5

NO. OF HOURS PER WEEK : 6

COURSE OBJECTIVES: To improve basics in Mathematics and analytical skills

UNITI: (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^{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 Sinnθ, Cosnθ, tannθ - Expansions of $Sin^n\theta$, $Cos^n\theta$- 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 :

1. Allied Mathematics,A.Singaravelu.
2. Ancillary Mathematics, A. ManickavasagamPillai 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:

3. www.freetechbooks.com/mathematics-f38.html
4. www.e-booksdirectory.com
5. www.freebookcenre.net/SpecialCat/Free-Mathematics-Books-Download.html

Question Paper Pattern :

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

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

PAPER TITLE: OFFICE PACKAGE – PRACTICAL

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: I	**CREDITS: 2**	**NO. OF HOURS PER WEEK: 2**

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 III
PAPER TITLE: PROGRAMMING IN C++

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: III	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the concepts of Programming in C++

UNIT I: (19 Hours) Introduction to C++; Tokens - Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Classes and Objects.

UNIT II(19 Hours): Functions in C++ - Main Function -Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions.

UNIT III: (19 Hours) Constructors and Destructors; and Operator Overloading and Type Conversions - Type of Constructors - Function overloading.

UNIT IV(18 Hours): Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance.

UNIT V: (15 Hours) Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations. Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Detection – File Pointers - Error Handling during File Operations.

1. Recommended Texts

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

2. Reference Books

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

WEBSITES:

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

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 IV
PAPER TITLE: C++ PRACTICAL

SUBJECT CODE :	**PRACTICAL**	**100 MARKS**
SEMESTER: III	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course train the students to solve the problems using C++ language

(15 Hours)

Class

1. Student Mark Sheet preparation using Class
2. Class and Object Implementation : to display item and cost

Constructor and Destructor

3. Constructor and Destructor implementation

(25 Hours)

Inline function and friend function

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

Polymorphism

6. Function Overloading
7. Overloading unary minus
8. Overloading binary operators - Complex number addition

(20 Hours)

Inheritance

9. Single inheritance
10. Multilevel inheritance

Streams

11. Program to implement Formatted I/O oper**ations.**
12. Reading and writing a class object using file

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

SUBJECT CODE :	THEORY	MAX. MARKS 100

SEMESTER: II

CREDITS: 5

NO. OF HOURS PER WEEK : 6

COURSE OBJECTIVES: To improve basics in mathematics and analytical skills

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

INTEGRAL CALCULUS :- Bernoulli's formula – Reduction formula for $\int \text{Sin}^n x\,dx$ - $\int \text{Cos}^n x\,dx$.
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, $\phi(x) = \text{Sin } mx$ (or) Cos mx (or) x^m. **PARTIAL DIFFERENTIALEQUATION** : 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 LaplaceTransformation : - 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

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

WEBSITES:

6. www.freetechbooks.com/mathematics-f38.html
7. www.e-booksdirectory.com
8. www.freebookcenre.net/SpecialCat/Free-Mathematics-Books-Download.html

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				100

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

NON MAJOR ELECTIVE
PAPER TITLE: HTML LAB - PRACTICAL

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: II	**CREDITS: 2**	**NO. OF HOURS PER WEEK: 2**

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 HTML documents (having multiple frames) in the following three formats:

Frame1	
Frame2	Frame3

9) Create a HTML document to add image

CORE V
PAPER TITLE: ANALYSIS OF ALGORITHM AND DATA STRUCTURES

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: III	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

Unit I: (15 Hours) Introduction: Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm.
Algorithm Design Techniques: Iterative techniques, Divide and Conquer Algorithms.

Unit II:(20 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.
Complexity Analysis: Medians & Order Statistics.

Unit III :(18 Hours): Data Structures:
Arrays: Single and Multi-dimensional Arrays, Sparse Matrices -Stacks: Implementing stack using array and linked list, Prefix, Infix and Postfix expressions, Utility and conversion of these expressions from one to another;

Unit IV: (18 Hours): Queues: Array and Linked representation of Queue, De-queue, Priority Queues-Linked Lists: Singly, Doubly and Circular Lists, representation of Stack and Queue as Linked Lists.

Unit V: (19 Hours) Recursion
Trees: Introduction to Tree as a data structure; Binary Trees, Binary Search Tree, (Creation, and Traversals of Binary Search Trees)
Graph - Definition, Types of Graphs, Traversal

Recommended Books:

T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein-Introduction to Algorithms, PHI, 3rd Edition 2009.

Sarabasse & A.V. Gelder Computer Algorithm –Introduction to Design and Analysis,Publisher– Pearson 3rd Edition 1999.

Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.

SartajSahni, Data Structures, "Algorithms and applications in C++", Second Edition, Universities Press, 2011.

Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using C and C++:, Second edition, PHI, 2009.

Robert L. Kruse, "Data Structures and Program Design in C++", Pearson.

D.S Malik, Data Structure using C++, Second edition, Cengage Learning, 2010.

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	2	
	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 VI
PAPER TITLE: ANALYSIS OF ALGORITHMS AND DATA STRUCTURES USING C++

SUBJECT CODE :	**PRACTICAL**	**100 MARKS**
SEMESTER: III	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course train the students to solve problems on computer algorithms and introduce data structures

1. Implement Insertion Sort (The program should report the number of comparisons)
2. Implement Merge Sort(The program should report the number of comparisons)
3. Implement Selection 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.
7. Array implementation of Queue
8. Implementation of Recursive function –Fibonacci series
9. Implementation of Single Linked list
10. Creation and traversal of Binary Search Tree.

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COURSE COMPONENT : OPERATIONS RESEARCH – III
(For B.Sc. Computer Science and BCA)

SUBJECT CODE :	THEORY	MAX. MARKS 100

SEMESTER: III

CREDITS: 5

NO. OF HOURS PER WEEK : 6

COURSE OBJECTIVES: To give an overall idea about the various Optimization techniques and their usages

UNIT – I : **(18 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 : **(18 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 : **(18 hours)**
Transportation Problem -- Assignment Problem.
Chapter 10, Section 10.1 to 10.73
Chapter 11, Section 11.1 to 11.6

UNIT – IV : **(18 hours)**
Sequencing problem , n jobs through 2 machines ,n jobs through 3 machines , 2 jobs through m machines , n jobs through m machines
Chapter 12, Section
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 : **(18 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:

9. www.researchgate.com
10. www.freecomputerbooks.com/special/operationsresearch.html
11. www.freetechbooks.com

Question Paper Pattern :

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

Distribution of Questions :

Sections	Units	No. of Questions	
		Theory	Problems
Section A	Unit – 1	1	1
	Unit – 2	1	1
	Unit – 3	1	1
	Unit – 4	1	1
	Unit – 5	1	1
Section B	Unit – 1		1
	Unit – 2		1
	Unit – 3		1
	Unit – 4		1
	Unit – 5		1
Section C	Unit – 1		
	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 VII
PAPER TITLE: PROGRAMMING IN JAVA

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: IV	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course train the students to solve the problems using Java language

UNIT I : (12 Hours) Introduction to Java – Object Oriented Concepts – Lexical Issues – Data Types – Variables – Arrays – Operators – Control Statements.

UNIT II: (20 Hours) Classes – Objects – Constructors – Overloading methods – Access Control – static and final methods – Inner Classes – String Class – Inheritance – Overriding methods – Using super Abstract class.

UNIT III: (22 Hours) Packages – Access Protection – Importing Packages – Interfaces – Exception Handling throw and throws – Thread – Synchronization – Messaging – Runnable Interface – Inter thread communication – Deadlock – suspending, resuming and stopping threads – Multithreading.

UNIT IV: **(14 Hours)** I/O Streams – File Streams – Applets – String Objects – String Buffer – Char Array – Java Utilities – Code Documentation.

UNIT V: **(22 Hours)** Working with windows using AWT classes – AWT controls – Layout Managers and Menus.

PRESCRIBED BOOKS:

1. P. Naughton and H.Schildt - Java 2(The Complete Reference) – Thrid Edition TMH 1999.

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.
7. Programming with Java, - A Primer – E.Balaguruswamy.

WEBSITES:

1. http://www.vogella.com/tutorials/JavaIntroduction/article.html

2. http://www.math.hcmuns.edu.vn/~hvthao/courses/java_programming/lecture_notes/

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

CORE VIII
PAPER TITLE:PROGRAMMING IN JAVA PRACTICAL

SUBJECT CODE :	**PRACTICAL**	**100 MARKS**
SEMESTER: IV	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 4**

COURSE OBJECTIVES: This course train the students to solve the problems using Java language.

Application **(40 Hours)**

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

Applet **(20 Hours)**

12. Generate various shapes using Applet
13. Point class manipulation
14. Draw a Human face
15. Program to create Checkbox, choice, RadioButton, Label and TextBox
16. Change Font and Color

GURU NANAK COLLEGE (AUTONOMOUS), CHENNAI – 600 042

(Effective for the batch of candidates admitted in 2017 – 2020)

COURSE COMPONENT : ALLIED STATISTICS – IV
(For B.Sc. Computer Science)

SUBJECT CODE :	THEORY	MAX. MARKS 100

SEMESTER: IV

CREDITS: 5

NO. OF HOURS PER WEEK : 6

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 an 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, Sectin 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, Sction 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, Se24.1,24.2
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:

12. www.e-booksdirectory.com
13. www.bookboon.com/en/statistics-and mathematics-ebooks
14. www.freebookcentre.net

Question Paper Pattern :

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

Distribution of Questions :

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

GURUNANAKCOLLEGE (AUTONOMOUS), CHENNAI – 600 042

(Effective for the batch of candidates admitted in 2016 – 2019)

COURSE COMPONENT : STATISTICAL METHODS AND THEIR APPLICATIONS

SUBJECT CODE :	PRACTICALS	MAX. MARKS 100

SEMESTER: IV

CREDITS: 2

NO. OF HOURS PER WEEK :2

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

Books for Study and References:

Mode, E.B.: Elements of Statistics - Prentice Hall

Wilks, S.S.: Elementary Statistical Analysis -Oxford and IBH

Snedecor, G.W., & Cochran, W.G.: Statistical Methods, Oxford and IBH

Simpson and Kafka: Basic Statistics

Burr, I.W.: Applied Statistical Methods, Academic Press.

Croxton, FE. and Cowden, D.J.: Applied General Statistics, Prentice Hall

Ostleo, B.: Statistics in Research, Oxford & IBH.

Sydney Siegel- Non-parametric Methods for Behavioural Sciences.

Daniel, W W- Biostatistics.

PRESCRIBED BOOKS :

1. Statistical methods and their applications by P.R.Vittal
2.

Question Paper Pattern :

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

CORE IX
PAPER TITLE: OPERATING SYSTEMS

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: V	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the functions of operating systems.

UNIT I: (15 Hours) Introduction: Views –Goals – OS Structure –Components – Services - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process –Threads - Interprocess Communication.

UNIT II: (24 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: (15 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**

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	2	
	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 X
PAPER TITLE: DIGITAL LOGIC AND COMPUTER ARCHITECTURE

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: V	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces digital logic fundamentals and Computer System Architecture.

Unit 1: Binary Systems & Code conversion, Boolean Algebra & Logic Gates – Truth Tables – Universal Gates – Simplification of Boolean functions: K-map, – Combinational Logic: Adders & Subtractors.

Unit-2: Multiplexer – Demultiplexer - Sequential Logic: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops – Shift Registers – Types of Shift Registers.

Unit -3:Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt.

Unit – 4: Central Processing Unit: Register organization arithmetic and logical micro-operations, stack organization, micro programmed control codes, machine language, assembly language, input output programming.

Unit -5: Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

PRESCRIBED BOOKS:

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

REFERENCE BOOKS:

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

Distribution of Questions :

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

CORE XI
PAPER TITLE: VISUAL PROGRAMMING AND DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: V	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the basic concepts of Visual Programming using Visual Basic and fundamentals of Database Management System

UNIT I: (15 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: (15 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's – The go to – Built-in-functions – String functions – Numeric functions – Date and Time functions – RND function – procedures and functions

UNIT III: (21 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: Characteristics of database approach, data models, DBMS architecture and data independence.

UNIT IV: (18 Hours) Entity Relationship and Enhanced ER Modeling: Entity types, relationships,
Relational Data Model : Basic concepts, relational constraints, relational algebra, SQL queries.

UNIT V : (21 Hours) Database design: ER to relational mapping, functional dependencies, normal forms up to third normal form, BCNF

PRESCRIBED BOOKS :

1. Gary Cornell, "Visual Basic 6" Tata McGraw Hill Publishing
2. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.

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.

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	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 XII
PAPER TITLE: VISUAL PROGRAMMING PRACTICAL

SUBJECT CODE :	**PRACTICAL**	**100 MARKS**
SEMESTER: V	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course train the students to solve the problems using Visual Programming

(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:

(a) Insertion
(b) Deletion
(c) Modification
(d) Generate simple reports using queries.

10. Telephone directory maintenance.
11. Payroll.
12. Invoice System.

ELECTIVE-I (INTER DISCIPLINARY)
(Offered to other departments)
PAPER TITLE: INTERNET AND ITS APPLICATIONS

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: V	**CREDITS:** 5	**NO. OF HOURS PER WEEK: 5**

COURSE OBJECTIVES: This course introduces the basic concepts of internet and its applications.

UNIT I: (5 Hours) Introduction to Computers: Programming Language types History of Internet Personal Computers History of World Wide Web

UNIT II: (7 Hours) Web Browsers -Internet Explorer - connecting to Internet Features of Internet explorer-Searching the Internet -online help and tutorials-File Transmission Protocol (FTP) Browser settings.

UNIT III: (8 Hours) Attaching a file, Electronic mail Creating an E-mail id Sending and Receiving mails attaching a file-Instance messaging - other web browsers.

UNIT IV: (15 Hours) Introduction to HTML Tags for Document structure (HTML, Head, Body Tag). Headings paragraph(<p> tag) – Font style elements: (bold, italic, strike, font) - line breaks- headers - Linking-Images- - lists – table – Frames – Forms : Input

UNIT V: (10 Hours) E-marketing consumer tracking Electronic advertising search engine-CRM-credit card payments Digital cash and e-wallets micro payments-smart card

PRESCRIBED BOOKS:

1) Internet and World Wide Web Third edition H.M.Deitel, P.J. Deitel and A.B.Goldberg-PHI

REFERENCE BOOKS:

1) The Internet -Complete Reference Harley Hahn, Tata McGraw Hill

PRACTICAL

1. To illustrate body and pre tags
2. To illustrate text Font tag
3. To illustrate comment, h1, … h6 and div tag
4. To illustrate text formatting tags
5. To illustrate Ordered list tag
6. To illustrate unordered list tag
7. To illustrate image tag
8. To illustrate Anchor tag
9. To illustrate Table tag
10. To illustrate frame tag
11. To illustrate form tag
12. Creating e-mail id, sending and receiving mail with attachment

CORE XIII
PAPER TITLE: DATA COMMUNICATION AND NETWORKING

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: VI	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the details about basic concepts of data communication and networking

Unit I(15 Hrs):
Basic concepts : Components of data communication, standards and organizations, Network Classification, Network Topologies ; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

Unit II(15 Hrs):
Physical Layer : Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway.

Unit III(15 Hrs):
Data Link Layer : Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA.

Unit IV(15 Hrs):
Network Layer : Virtual Circuits and Datagram approach, IP addressing methods – Subnetting; Routing Algorithms (adaptive and non-adaptive)

Transport Layer: Transport services, Transport Layer protocol of TCP and UDP

Unit V(15 Hrs):
Application Layer : Application layer protocols and services – Domain name system, HTTP, WWW, telnet, FTP, SMTP

Network Security : Common Terms, Firewalls, Virtual Private Networks

Books Recommended:

B.A. Forouzan: Data Communication and Networking, 4th Edition, Tata McGraw Hill, 2007.

D.E. Comer, Internetworking with TCP/IP, Vol. I, Prentice Hall of India, 1998.

W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.

D. Bertsekas, R. Gallager, Data Networks, 2nd edition, Prentice Hall of India, 1992.

WEBSITES:
1. https://www.cs.purdue.edu/homes/park/cs536-lectures.html
2. http://nptel.ac.in/courses/IIT-MADRAS/Computer_Networks/

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

CORE XIV
PAPER TITLE: WEB PROGRAMMING WITH PHP AND MYSQL

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: VI	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: To earns skill set to develop online information system using the open sources PHP and MySQL.

Unit -I Introduction: (15 Hrs)
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 Arrays and Functions: (15 Hrs)
Arrays: Creating an array- modifying array - processing array – grouping form with arrays - using array functions - creating user defined functions - using files

Unit —III (15 Hrs)
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 (15 Hrs)
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 PHP with MYSQL: (15 Hrs)
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.

Text 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.

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	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 XV
PAPER TITLE: WEB PROGRAMMING WITH PHP AND MYSQL - PRACTICAL

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: V	**CREDITS:** 4	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course train the students to develop applications with PHP and MySQL

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

ELECTIVE II
PAPER TITLE: SOFTWARE ENGINEERING

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: VI	**CREDITS: 5**	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the details about the concepts of life cycle of software

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: (20 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: (16 Hours) Implementation issues: Structured Coding techniques – coding style – standards and guidelines – documentation guidelines – type checking – scooping 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-9th Edition,Darling Kindersley,2011
3. Roger S.Pressman,Software Engineering A Practitioner's Approach-6th Edition, McGraw-Hill,2005
4. R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.
5. RajibMall ,2004,Fundamentals of Software Engineering,2nd Edition, PHI.

WEBSITES:

1. **http://people.cs.missouri.edu/~duanye/cs4320/lectures.htm**

2. **http://iiscs.wssu.edu/drupal/node/4566**

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

ELECTIVE II
PAPER TITLE: DATA MINING

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: VI	**CREDITS: 5**	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the concepts of Data Mining

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, Petitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method.

1. Recommended Texts

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

2. Reference Books

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

3. Website, E-learning resources

i http:// www.academicpress.com

ii. http://www.mkp.com

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

ELECTIVE II
PAPER TITLE: SOFTWARE TESTING

SUBJECT CODE :	**THEORY**	**100 MARKS**
SEMESTER: VI	**CREDITS: 5**	**NO. OF HOURS PER WEEK: 6**

COURSE OBJECTIVES: This course introduces the concepts of Software Testing.

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