GURU NANAK COLLEGE (AUTONOMOUS)

(Affiliated to University of Madras and Re-Accredited at 'A' Grade by NAAC)

Velachery Main Road, Velachery, Chennai – 600042.

B.Sc. Computer Science

(SEMESTER PATTERN WITH CHOICE BASED CREDIT SYSTEM)

Syllabus

(For the candidates admitted in the Academic year 2016-17 and thereafter)

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 2016-17 BATCH

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - I	I	Language	16UTAMF01/ 16USANF01/ 16UHINF01/ 16UFREF01	Language – I	3	6	50	50	100
	II	English	16UENGF41	English – I	3	4	50	50	100
	III	Core Paper-I	16UCSCC01	Programming in C	4	6	50	50	100
	III	Core Paper-II	16UCSCC02P	Programming in 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	16UADT401/ 16UBAT401/ 16UNME01L	Advanced Tamil - I / Basic Tamil –I / Office Package – Practical	2	2	50	50	100
	IV	Soft Skills-I	16UGSLS01	Listening and Speaking Skills	3	2	-	100	100
Total Credits: 24 / TOTAL HOURS: per week: 30									
Semester - II	I	Language	16UTAMF02/ 16USANF02/ 16UHINF02/ 16UFREF02	Language - II	3	6	50	50	100
	II	English	16UENGF42	English - II	3	4	50	50	100
	III	Core Paper-III	16UCSCC03	Digital Logic Fundamentals & Microprocessor	4	6	50	50	100
	III	Core Paper-IV	16UCSCC04P	Microprocessor Practical	4	4	50	50	100
	III	Allied-II	16UMATA15	Mathematics II	5	6	50	50	100
	IV	Non Major Elective-II / Basic/ Advance Tamil	16UADT402/ 16UBAT402 / 16UNME02LP	Advanced Tamil - II / Basic Tamil –II / HTML Lab – Practical	2	2	50	50	100
	IV	Soft Skills-II	16UGSLS02	Reading and Writing Skills	3	2		100	100
Total Credits: 24 / TOTAL HOURS: per week: 30									

B.Sc. (COMPUTER SCIENCE)
COURSE STRUCTURE 2016-17 BATCH

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - III	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	16UCSCC05	Programming in C++ & Data Structures	4	6	50	50	100
	III	Core Paper-VI	16UCSCC06P	C++ Practical	4	4	50	50	100
	III	Allied-III	16UMATA19	Operations Research	5	8	50	50	100
	IV	Soft Skills-III	16UGSLS03	Personality Enrichment	3	2		100	100
Total Credits: 22 / TOTAL HOURS: per week: 30									
Semester - IV	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	16UCSCC07	Programming in Java	4	6	50	50	100
	III	Core Paper-VIII	16UCSCC08P	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 - Practicals	-	2	50	50	100
	IV	Soft Skills-IV	16UGSLS05	Quantitative Aptitude	3	2	-	100	100
	IV	EVS	16UEVS401	Environmental Studies	2	2	*	100	100
Total Credits: 24 / TOTAL HOURS: per week: 30									

B.Sc. (COMPUTER SCIENCE)
COURSE STRUCTURE 2016-17 BATCH

Semester	Part	Course Component	Subject Code	Subject Name	Credits	Hours	Internal	External	Total
Semester - V	III	Core Paper-IX	16UCSCC09	Operating systems	4	6	50	50	100
	III	Core Paper-X	16UCSCC10	Database Management Systems	4	6	50	50	100
	III	Core Paper-XI	16UCSCC11	Visual Programming	4	6	50	50	100
	III	Core Paper-XII	16UCSCC12	Visual Programming – Practical	4	6	50	50	100
	III	Elective-I (Interdisciplinary Elective)	16UCSCE01P	RDBMS USING MYSQL	5	5	50	50	100
	IV	Value Education	16UVED401	Value Education	2	1	-	100	100
Total Credits: 23 / Total Hours per week: 30									
Semester - VI	III	Core Paper-XIII	16UCSCC13	Data Communication & Networking	4	6	50	50	100
	III	Core Paper-XIV	16UCSCC14	Web Technology	4	6	50	50	100
	III	Core Paper-XV	16UCSCC15P	Web Technology – Practical	4	6	50	50	100
	III	Elective-II	16UCSCE02/ 16UCSCE03/ 16UCSCE04	Software Engineering/ Computer Graphics/ Software Testing	5	6	50	50	100
	III	Elective-III	16UCSCE03	Mini Project	5	6	50	50	100
	V	Extension Activity	16UEXT501	Participation in NSS/NCC/ROTRACT etc.	1	-	-	-	-
Total Credits: 23 / Total Hours per week: 30									
Grand Total Credits: 140 / Total Hours per week: 180									

CORE PAPER-I
PAPER TITLE: PROGRAMMING IN C

SUBJECT CODE: 16UCSCC01	THEORY	MARKS 100
SEMESTER: I	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- Develop an in-depth understanding of functional and logical programming paradigms.
- By learning the basic programming constructs, they can easily adopt to any other programming language.

UNIT I: **(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.

UNIT II: **(18 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: **(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 - Self-referential structures – 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. E. Balaguruswamy, 1995, Programming in ANSI C, TMH Publishing Company Ltd.
2. 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/

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

PAPER TITLE: PROGRAMMING IN C PRACTICAL

SUBJECT CODE: 16UCSCC02P	PRACTICAL	MARKS 100
SEMESTER: I	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:
- To acquire knowledge in how to apply the specification of syntax rules for numerical constants and variables, data types.
- 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.

SUBJECT CODE: 16UMATA11	THEORY	MARKS 100
SEMESTER: I	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- 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^{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 $\mathrm{Sin}n\theta$, $\mathrm{Cos}n\theta$, $\mathrm{tan}n\theta$ - Expansions of $\mathrm{Sin}^n\theta$, $\mathrm{Cos}^n\theta$-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. 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
2. www.e-booksdirectory.com
3. www.freebookcenre.net/SpecialCat/Free-Mathematics-Books-Download.html

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

DISTRIBUTION OF QUESTIONS:

Sections	Units	No. of Questions Theory	No. of Questions 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		1
	Unit – 3		1
	Unit – 4		1
	Unit – 5		1
Section C	Unit – 1		21 (a),(b)
	Unit – 2		22(a),(b)
	Unit – 3		23(a),(b)
	Unit – 4		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.

PAPER TITLE: OFFICE PACKAGE – PRACTICAL

SUBJECT CODE: 16UNME01L	Practical	MARKS 100
SEMESTER: I	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVES:
- 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.

UNIT I: MS Word (Word Processor)   **(6 Hours)**
Starting MS-WORD. Creating documents. Menus and functions. Mouse operations / keyboard operations. Designing Document. Typing text. Formatting features. Block operations. Tool bars. Saving and Printing. Creating a document, Creating Tables, Insert columns / rows. Formatting text (Fonts / justification).

UNIT II: INSERTING AND ALIGNING PICTURES.   **(6 Hours)**
Saving and Printing. Mail merge. Concept of mail merge. Creating data source. Creating document, Merging and printing of mails.

UNIT III: MS EXCEL (SPREAD SHEET)   **(6 Hours)**
Introduction to Excel, Navigating selecting cells. Entering and editing numbers / text / formulae / date / formatting rows / columns. copying / pasting values / formulae. Insert / delete rows / columns. Renaming worksheets Creating a chart, Saving / opening / closing a file.

UNIT IV: MS EXCEL FUNCTIONS   **(6 Hours)**
ROUND ( ) SORT ( ) AVERAGE ( ) MAX ( ) MIN ( ) COUNT ( ) SUM ( ) IF ( ) ABS ( ) ROMAN ( ) UPPER ( ) LOWER ( ) CELL ( ) TODAY ( ) NOW ( )

UNIT V: MS POWER POINT   **(6 Hours)**
Role of presentation. Working with power point, inserting a new slide, Text formatting, Insert Table, clipart / picture. Creating animations, saving the presentation.

PRESCRIBED BOOKS:
1. Dinesh Maldasani, 2005, Learning Computer Fundamentals, Ms Office and Internet & Web Tech., FireWall Media

PAPER TITLE: DIGITAL LOGIC FUNDAMENTALS & MICROPROCESSOR

SUBJECT CODE: 16UCSCC03	THEORY	MARKS 100
SEMESTER: II	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- This course gives knowledge about various basic digital gates used in digital system and to develop and construct logical circuits using logic gates, combinational and sequential circuits.
- This course designed to understand about the basic 8085 microprocessor architecture.

UNIT I: **(18 Hours)**
Binary Systems & Code conversion, Boolean Algebra & Logic Gates – Truth Tables – Universal Gates – Simplification of Boolean functions: SOP, POS methods – K-map.

UNIT II: **(18 Hours)**
Combinational Logic: Adders & Subtractors – Multiplexer – Demultiplexer - Encoder – Decoder. Sequential Logic: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops – Shift Registers – Types of Shift Registers

UNIT III: **(18 Hours)**
Introduction to Microprocessors, Microcomputers, and Assembly Language – Microprocessor Architecture and Its Operations – Memory – I/O Devices – 8085 MPU.

UNIT IV: **(18 Hours)**
Introduction to 8085 Instructions – Data Transfer Operations – Addressing Modes - Arithmetic, Logic and Branch Operations – Writing Assembly Language Programs.

UNIT V: **(18 Hours)**
BCD to Binary Conversion and Vice-versa – BCD to HEX Conversion and Vice-versa – Binary to ASCII Conversion and Vice-versa – BCD Addition and Subtraction.

PRESCRIBED BOOKS:
1. V. Vijayendran,2004, Digital Fundamentals,S. Viswanathan (Printers & Publishers) Pvt. Ltd.
2. Ramesh S. Gaonkar,1999, Microprocessor Architecture, Programming, and Applications with the 8085, 5thEdition, Penram International Publishing (India) Pvt. Ltd.

REFERENCE BOOKS:
1. M. Morris Mano,2005, Digital Logic and Computer Design, Prentice-Hall of India Pvt. Ltd.
2. V. Vijayendran ,2004, Fundamentals of Microprocessor – 8085, S. Viswanathan (Printers & Publishers) Pvt. Ltd.
3. D. P. Leach and A. P. Malvino,2002,Digital Principles and Applications,5th Edition, Tata McGraw, Hill Publishing Co. Ltd.
4. N. K. Srinath,2005, 8085 Microprocessor Programming and Interfacing,Prentice-Hall of India Pvt. Ltd.
5. William W.Gothmann,Digital Electronics An introduction to theory and   practice,

AsokeK.Ghosh,1982
6. K.Jain,Fundamentals of digital Image Processing, Pearson Education,1989
7. C.Bartee,Digital Computer Fundamentals,McGraw-Hill

WEBSITES:
1. http://www.ece.utah.edu/~kalla/index_3700.html
2. https://www.wiziq.com/tutorial/190965-8085-Microprocessor-Class-notes

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

CORE PAPER- IV
PAPER TITLE: MICROPROCESSOR PRACTICAL

SUBJECT CODE: 16UCSCC04P	PRACTICAL	MARKS 100
SEMESTER: II	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:
- This course provides practical knowledge in design and implementation of combinational logic circuits, sequential logic circuits.
- This course gives the practical approach how to implement 8085 assembly language programs.

(20 Hours)

1. 8 Bit Addition and Subtraction.
2. 16 Bit Addition.
3. BCD Addition.
4. BCD Subtraction.

(20 Hours)

5. 8 Bit Multiplication.
6. BCD Multiplication.
7. 8 Bit Division.
8. Searching for an Element in an Array.

(20 Hours)

9. Sorting in Ascending and Descending Orders.
10. Finding Largest and Smallest Elements from an Array.
11. Reversing Array Elements.
12. Block Move.

ALLIED PAPER-II
PAPER TITLE: MATHEMATICS – II

SUBJECT CODE: 16UMATA15	THEORY	MARKS 100
SEMESTER: II	CREDITS: 5	TOTOAL HOURS: 90

COURSE OBJECTIVES:
- To improve basics in mathematics and analytical skills

UNIT-I: INTEGRAL CALCULUS: (18 Hours)
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: FOURIER SERIES: (18 Hours)
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: DIFFERENTIAL EQUATION: (18 Hours)
Second order Differential Equation with Constant Coefficients. 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 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: LAPLACE TRANSFORMATION (18 Hours)
- 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: INVERSE LAPLACE TRANSFORMATION: (18 Hours)
- 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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2. Ancillary Mathematics, A. Manickavasagam Pillai and Narayanan.
3. Allied Mathematics, P.R.Vittal.

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   Co,New Delhi.
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C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

DISTRIBUTION OF QUESTIONS:

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

SUBJECT CODE: 16UNME02LP	THEORY	MARKS 100
SEMESTER: II	CREDITS: 2	TOTAL HOURS: 30

COURSE OBJECTIVES:

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

UNIT I: INTRODUCTION: (6 Hours)

Web Basics: What is Internet – Web browsers – What is Web page – HTML Basics: Understanding tags.

UNIT II: (6 Hours)

Tags for Document structure (HTML, Head, Body Tag). Block level text elements: Headings paragraph (<p> tag) – Font style elements: (bold, italic, font, small, strong, strike, big tags).

UNIT III: (6 Hours)

Lists: Types of lists: Ordered, Unordered – Nesting Lists – Other tags: Marquee, HR, and BR- Using Images – Creating Hyperlinks.

UNIT IV: (6 Hours)

Tables: Creating basic Table, Table elements, Caption – Table and cell alignment – Row span, Column span – Cell padding.

UNIT V: (6 Hours)

Frames: Frameset – Targeted Links – No frame – Forms: Input, Textarea, Select, Option.

PRESCRIBED BOOKS:

 1. HTML Complete Reference, Teach Yourself Web Publishing with HTML –   Laura Lemay.

REFERENCE BOOKS:

1. HTML – E Stephen Mack, Janan Platt.

WEBSITES:

1. www.w3schools.com/html/
2. www.tutorialspoint.com/html/

CORE PAPER-V
PAPER TITLE: PROGRAMMING IN C++ AND DATA STRUCTURES

SUBJECT CODE: 16UCSCC05	THEORY	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 90

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

UNIT I: (18 Hours)
Introduction to C++; Tokens - Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Classes and Objects; Functions in C++ - Main Function -Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions.

UNIT II: (18 Hours)
Constructors and Destructors; and Operator Overloading and Type Conversions - Type of Constructors - Function overloading. Inheritance: Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance.

UNIT III: (18 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.

UNIT IV: (18 Hours)
Definition of a Data structure - primitive and composite Data Types, Arrays, Operations on Arrays, Ordered lists. Stacks - Operations - Applications of Stack - Infix to Postfix Conversion, Recursion, Queue- operations.

UNIT V: (18 Hours)
Singly Linked List - Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List - Operations. Trees – Operations. Graph – Types of Graphs.

PRESCRIBED BOOKS:
1. E. Balagurusamy,1995, Object Oriented Programming with C++, Tata McGraw-Hill
2. E.Horowitz and S.Shani,1999,Fundamentals of Data Structures in C++ , Galgotia Pub

REFERENCE BOOKS:
1. Maria Litvin, Programming with C++ and Data Structures, Sky light Publishing,2003
2. R.Rajaram, Object Oriented Programming and C++,New Age International, 2007,1997
3. John.R.Hubbard, Programming with C++,McGraw-Hill,2000,1996
4. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.

5. H.Schildt, C++,1998,The Complete Reference-1998-TMH Edition, 1998

6. R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C, PHI.

7. Cangsam, Auguenstein, Tenenbaum,Data Structures using C & C++,PHI

8. D.Samantha,2005, Classic Data Structures, PHI,New Delhi.

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	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

CORE PAPER-VI
PAPER TITLE: C++ PRACTICAL

SUBJECT CODE: 16UCSCC06P	PRACTICAL	MARKS 100
SEMESTER: III	CREDITS: 4	TOTAL HOURS: 60

COURSE OBJECTIVES:
- To solve problems using data structures such as Stack, Queues, Linked list hash tables, binary trees, and graphs and writing programs for these solutions.
- This will provide the students to gain the acquaintance in practical applications of different data structures.

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

(30 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

(30 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

ALLIED PAPER-III
PAPER TITLE: OPERATIONS RESEARCH

SUBJECT CODE: 16UMATA19	THEORY	MARKS 100
SEMESTER: III	CREDITS: 5	TOTAL HOURS: 120

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, 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: **(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
2. www.freecomputerbooks.com/special/operationsresearch.html
3. 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**
	TOTAL MARKS	**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		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

SUBJECT CODE: 16UCSCC07	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 90

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 – Lexical Issues – Data Types – Variables – Arrays – Operators – Control Statements.

UNIT II: **(18 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: **(18 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: **(18 Hours)**
I/O Streams – File Streams – Applets – String Objects – String Buffer – Char Array – Java Utilities – Code Documentation.

UNIT V: **(18 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/

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

PAPER TITLE: PROGRAMMING IN JAVA PRACTICAL

SUBJECT CODE: 16UCSCC08P	PRACTICAL	MARKS 100
SEMESTER: IV	CREDITS: 4	TOTAL HOURS: 60

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 **(30 Hours)**

1. Area and perimeter of a circle
2. Largest of 3 numbers
3. Calculate Simple and Compound Interest by using String Buffer Class
4. Function overloading
5. Function overriding
6. Factorial using recursion
7. Random number generation using Random class
8. Vector Manipulation
9. To illustrate Thread
10. To illustrate Exception handling

APPLET **(30 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 TextBox
15. Change Font and Color

PAPER TITLE: STATISTICAL METHODS AND THEIR APPLICATIONS

SUBJECT CODE: 16UMATA25	THEORY	MARKS 100
SEMESTER: IV	CREDITS: 5	TOTAL HOURS: 60

COURSE OBJECTIVES:
- To introduce basic concepts of Statistics and computing statistical aspects

UNIT I: **(12 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, Section 5.1 to 5.8
Chapter 6, Section 6.1 to 6.4
Chapter 7, 7.1 and 7.2

UNIT II: **(12 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: **(12 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: **(12 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: **(12 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
2. www.bookboon.com/en/statistics-and mathematics-eBooks
3. 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	13–20	8	**40**
Section C	**Essay** Answer any **2** questions	21– 24	20	**40**
	TOTAL MARKS			**100**

DISTRIBUTION OF QUESTIONS:

Sections	Units	No. of Questions Theory	No. of Questions 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		21(a),21(b)
	Unit – 2		22(a)
	Unit – 3		22(b)
	Unit – 4		23(a),23(b)
	Unit - 5		24(a),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.

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

SUBJECT CODE: 16UMATA26P	PRACTICALS	MARKS 100
SEMESTER: IV	CREDITS: -	TOTAL HOURS: 30

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

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	50	50

PAPER TITLE: QUANTITATIVE APTITUDE

SUBJECT CODE: 16UGSLS05	**THEORY**	**MARKS 100**
SEMESTER: IV	**CREDITS: 3**	**TOTAL HOURS: 30**

COURSE OBJECTIVES:

- To improve aptitude skill.

UNIT-I: **(6 Hours)**

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

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

SUBJECT CODE: 16UCSCC09	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

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: INTRODUCTION   (18 Hours)
Views –Goals – OS Structure –Components – Services - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process –Threads - Interprocess Communication.

UNIT II: CPU SCHEDULING   (18 Hours)
CPU Schedulers – Scheduling criteria – Scheduling Algorithms - Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region.

UNIT III: DEADLOCK   (18 Hours)
Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock. Secondary Storage Structures: Protection – Goals- Domain Access matrix.

UNIT IV: MEMORY MANAGEMENT   (18 Hours)
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: VIRTUAL MEMORY   (18 Hours)
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

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

CORE PAPER-X
PAPER TITLE: DATABASE MANAGEMENT SYSTEMS

SUBJECT CODE: 16UCSCC10	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To understand and apply various Normalization techniques
- To create database table and use query language

UNIT I: **(18 Hours)**
Advantages and Components of a Database Management Systems – Feasibility Study – Class Diagrams – Data Types – Events – Normal Forms – Integrity – Converting Class Diagrams to Normalized Tables – Data Dictionary.

UNIT II: **(18 Hours)**
Query Basics – Computation Using Queries – Subtotals and GROUP BY Command – Queries with Multiple Tables – Subqueries – Joins – DDL & DML – Testing Queries.

UNIT III: **(18 Hours)**
Effective Design of Forms and Reports – Form Layout – Creating Forms – Graphical Objects – Reports – Procedural Languages – Data on Forms – Programs to Retrieve and Save Data – Error Handling.

UNIT IV: **(18 Hours)**
Power of Application Structure – User Interface Features – Transaction – Forms Events – Custom Reports – Distributing Application – Table Operations – Data Storage Methods – Storing Data Columns – Data Clustering and Partitioning.

UNIT V: **(18 Hours)**
Database Administration – Development Stages – Application Types – Backup and Recovery – Security and Privacy – Distributed Databases – Client/Server Databases – Web as a Client/Server System – Objects – Object Oriented Databases – Integrated Applications.

PRESCRIBED BOOKS:
1. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

REFERENCE BOOKS:
1. Raghu Rama Krishnan, Database Management Systems-2nd Edition, McGraw-Hill Companies,2000,1998
2. Abraham Silberschatz, Database System Concepts-3rd Edition,McGraw-Hill Companies
3. R. Priyadharshini Database Management Systems, V.Ramesh,2007
4. Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.
5. C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley - 2000.

WEBSITES:
1. http://pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/slides/slides3ed.html
2. http://academic.udayton.edu/SaverioPerugini/courses/cps430/lecture_notes/index.html

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

SUBJECT CODE: 16UCSCC11	THEORY	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To use the properties and methods of forms and controls to create VB programs.
- To write procedures to perform input, processing, and output.

UNIT I: VISUAL BASIC FUNDAMENTS **(18 Hours)**
Constants – Variables – Data Types and Data Declarations – Operators and Expressions – Hierarchy of Operations – Inserting Paranthesis - Assigning Values to Variables – Displaying Output – The Print Statement – Library Functions – Branching and Looping.

UNIT II: CONTROL FUNDAMENTALS **(18 Hours)**
Control Tools – Categories – Working with Controls – Naming Forms and Controls – Assigning Property values to Forms and Controls - Event Procedures and Command Button – Label – Text Box – Check Box – Option Button – Frame – List Box – Combo Box – With Block - MsgBox – Timer – Scroll Bars.

UNIT III: MENUS AND DIALOG BOXES **(18 Hours)**
Drop Down Menus –Keyboard Shortcut – Submenus – Pop-Up Menus – Dialog Boxes – More about MsgBox Function – InputBox Function.

UNIT IV: PROCEDURES **(18 Hours)**
Modules and Procedures – Sub procedure – Even Procedures –Function Procedures – Scope – Optional Arguments.

UNIT V : ARRAYS **(18 Hours)**
Characteristics – Declarations – Processing Array Elements – Passing Arrays to Procedures – Dynamic Arrays – Array Related Functions – Control Arrays – Looping with For Each –NextData Files: Data File Characteristics – The Common Dialog Control – Processing a Data File – Text, Random Access and Binary Files.

PRESCRIBED BOOKS:
1. Byron S. Gottfried – Visual Basic - Schaum's Outlines – McGraw hill Edition 2002.

REFERENCE BOOKS:
1. N.Krishnan,Visual Basic 6.0 in 30 days,V.Ramesh,2000
2. Byrons.Gottfried ,Visual Basic,TataMcGaw-Hill,2002
3. Rob Thayer ,Visual Basic(6)-1st Edition,MacMillan,1998
4. Gary Cornell- Visual Basic 6 from the Ground up- Tata McGraw Hill-1999.

QUESTION PAPER PATTERN:

Section	Question Component	Numbers	Marks	Total
A	Answer any 10 out of 12	1-12	2	20
B	Answer any 5 out of 8	13-20	8	40
C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS			**100**	

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	2	
	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	0	

CORE PAPER-XII
PAPER TITLE: VISUAL PROGRAMMING PRACTICAL

SUBJECT CODE: 16UCSCC12	PRACTICAL	MARKS 100
SEMESTER: V	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To use structured Query language and its syntax, Transactions and techniques for query optimization.
- Using any RDBMS package students can create database and perform the operations such as Insertion, Deletion, Modification, Generating a reports.

(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 Oracle, 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.

<div align="center">

ELECTIVE-I
PAPER TITLE: RDBMS using MySQL

</div>

SUBJECT CODE: 16CCSCE01P	PRACTICAL	MARKS 100
SEMESTER: V	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To inculcate knowledge on RDBMS concepts and Programming with MySQL.

UNIT I: **(18 Hours)**
RDBMS - A Relational Database: Understanding Tables, Records, And Fields -Understanding Primary And Foreign Keys - Sql And Sql Queries -Using The MySQL Command-Line Client -Interacting With MySQL Through A Graphical Client .

UNIT II: **(18 Hours)**
Working with Databases and Tables: Databases - Creating Tables: Specifying Field Data Types - Selecting the Most Appropriate Data Type - Adding Field Modifiers and Keys -Selecting a Table Type. Altering Tables: Field Names -Altering Field Properties -Adding and Removing Fields and Keys - Altering Table Types. Backing Up And Restoring Databases And Tables: Restoring Databases And Tables From Backup. Dropping Databases and Tables -Viewing Database, Table, and Field Information

UNIT III: **(18 Hours)**
Editing Records and Performing Queries: Inserting Records-Editing and Deleting Records. Performing Queries :Retrieving Specific Columns -Filtering Records With A Where Clause -Using Operators -Sorting Records And Eliminating Duplicates -Limiting Results -Using Built-In Functions - Grouping Records -Joining Tables -Using Sub Queries -Using Table And Column Aliases

UNIT IV: **(18 Hours)**
Using the MySQL Security System: Understanding the Need for Access Control -Understanding How MySQL Access Control Works -Assigning, Revoking, And Viewing User Privileges. Working with User Accounts and Password: Creating and Removing User Accounts -Altering User Passwords.

UNIT V: **(18 Hours)**
Sample Application: Order Tracking System: Understanding Requirements. Creating An Optimized Database Design: Designing the Customer Tables -Designing the Product Tables -Designing the Order Table -Creating and Populating the Tables -Querying the Database.

PRESCRIBED BOOKS:
1. VIKRAM VASWANI, "PHP and MySQL", Tata McGraw-Hill, 2005
2. BEN FORTA, "MySQL Crash course" SAMS, 2006.

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.

WEBSITES:
https://www.tutorialspoint.com/mysql/
https://www.w3resource.com/mysql/mysql-tutorials.php

RDBMS using MySQL
1. Creating simple table with constraints
2. Insertion of rows in MYSQL
3. Updating of rows in MYSQL
4. Deletion of rows in MYSQL
5. Searching of data by different criteria
6. Sorting of data
7. Subtotals and GROUP BY Command
8. Queries with Multiple Tables
9. Subqueries
10. Demonstration of inner join
11. Demonstration of outer join
12. Usage of aggregate functions
        i. avg
        ii. count
        iii. min
        iv. max
        v. sum

PAPER TITLE:VALUE EDUCATION

SUBJECT CODE: 16UVED401	THEORY	MARKS 100
SEMESTER: V	CREDITS: 2	TOTAL HOURS: 15

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

DISTRIBUTION OF QUESTIONS:

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

PAPER TITLE: DATA COMMUNICATION AND NETWORKING

SUBJECT CODE: 16UCSCC13	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

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 & standards and standards organizations - 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)**

History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol - ATM - ATM Topology - ATM Protocol.

UNIT V: **(18 Hours)**

Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web.

PRESCRIBED BOOKS:
1. Behrouz and Forouzan,2001, Introduction to Data Communication and Networking, 2nd Edition, TMH.

REFERENCE BOOKS:
1. BehrouzA.Forouzan,Data Communication and Networking-4thEdition,Tata McGraw-Hill,
2. BehrouzA.Forouzan,Data Communication and Networking-2ndEdition,Tata McGraw-Hill
3. S. Tanenbaum,Computer Network,AndrewS.Tanenbaum,Asoke K.Ghosh,2003
4. Jean Walrand 1998,Communication Networks (A first Course),Second Edition, WCB/McGraw Hill.
5. Behrouz and Forouzan,2006,Data Communication and Networking,3nd Edition ,TMH.

WEBSITES:

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

QUESTION PAPER PATTERN:

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A	Answer any 10 out of 12	1-12	2	20
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C	Answer any 2 out of 4	21-24	20	40
TOTAL MARKS		**100**		

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	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	0	

CORE PAPER-IV
PAPER TITLE: WEB TECHNOLOGY

SUBJECT CODE: 16UCSCC14	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To be able to design, create simple customized webpages.
- To study formatting and data validation in web pages.

UNIT I: **(18 Hours)**
Introduction to Javascript – Advantages of Javascript – Javascript syntax - Data type –Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box.

UNIT II: **(18 Hours)**
Javascript document object model – Introduction – Object in HTML – Event Handling – Window object – Document object – Browser object – Form object – Navigator object – Screen object – Build in object – User defined object – Cookies.

UNIT III: **(18 Hours)**
ASP.NET Language Structure – Page Structure – Page event , Properties & Compiler Directives . HTML server controls – Anchor, Tables, Forms, Files.

UNIT IV: **(18 Hours)**
Basic Web server Controls – Lable, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List Web Server Controls – Check box list. Radio button list, Drop down list, List box, Data grid, Repeater. Request and Response Objects, Cookies,

UNIT V: **(18 Hours)**
Working with Data – OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced issues – email, Application issues, working with IIS and page Directives, error handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates.

PRESCRIBED BOOKS:
1. Bayross, 2000, Web Enable Commercial Application Development Using HTML,   DHTML, Javascript, Perl CGI, BPB Publications.
2. A.Russell Jones, Mastering Active Server Pages 3, BPB Publications.

REFERENCE BOOKS:
1. S.Padmapriya,Web Technology,V.Ramesh,2011
2. Daniel Minali,Web Commerce and technology handbook,McGraw-Hill Companies,1998
3. HathleenKalata, Internet Programming with VBScript and JavaScript, Thomson Learning
4. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications
5. T.A. Powell, 2002,Complete Reference HTML , TMH.
6. J.Jaworski, 1999, Mastering Javascript, BPB Publications.
7. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition2004, TMH

WEBSITES:
1. http://www.w3schools.com/

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	Unit – 4	2	
	Unit – 5	1	
Section C	Unit – 1	1	
	Unit – 2	1	
	Unit – 3	1	
	Unit – 4	1	
	Unit - 5	0	

CORE PAPER-XV
PAPER TITLE: WEB TECNOLOGY PRACTICAL

SUBJECT CODE: 16UCSCC15P	PRACTICAL	MARKS 100
SEMESTER: VI	CREDITS: 4	TOTAL HOURS: 90

COURSE OBJECTIVES:
- To develop the ability to logically plan and develop web pages.
- To learn to write, test, and debug web pages using client and server side Scripting languages like Javascript, ASP.NET

JAVASCRIPT

1. Write a program to tabulate square, root, cube and complement of integers between 1 and 10.
2. Write a script to perform all arithmetic operations using user defined function.
3. Write a script to Sort numbers and strings.
4. Write a script to create a digital clock.
5. Create a web page using two image file which switch black and white one another as the mouse pointer moves over the image. Use the On Mouse over and On Mouse event, on Dblclick handler
6. Build a WWW page with an image and 3 buttons., Pick three favorite graphics, Label the buttons and make each one swap in the graphic you have chosen
7. Create a frameset that has two frames, side by side.
   1.Make the left-hand frame contain a form with 3 radio buttons
   2. The buttons should be for three search engines:
      a. Yahoo (http://www.yahoo.com)
      b. Altavista (http://www.altavista.com)
   3. Infoseek (http://www.infoseek.com) When the user clicks on of the option buttons, the frame on the right hand side should be loaded with the right search engine.

ASP .NET

1. Create a login form, to expire, if the user does not type the password within 100 seconds
2. Create an employee database and manipulate the records
3. Develop an application to illustrate the usage of Request and Response Objects in ASP.
4. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.
5. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

ELECTIVE II
PAPER TITLE: SOFTWARE ENGINEERING

SUBJECT CODE: 16UCSCE02	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

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 – 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

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	Unit – 3	1	
	Unit – 4	1	
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ELECTIVE II
PAPER TITLE: SOFTWARE TESTING

SUBJECT CODE: 16UCSCE04	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

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, SrinivasanDesikan& 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 – 4	1	
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ELECTIVE II
PAPER TITLE: COMPUTER GRAPHICS

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SUBJECT CODE: 16UCSCE03	THEORY	MARKS 100
SEMESTER: VI	CREDITS: 5	TOTAL HOURS: 90

COURSE OBJECTIVES:

- To familiarize the working of graphical devices such as CRT monitor
- To provide knowledge of line, circle, ellipse drawing algorithms, clipping 2D, 3D transformation and projections

UNIT I: INTRODUCTION TO COMPUTER GRAPHICS: (18 Hours)
Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.

UNIT II: OUTPUT PRIMITIVES AND THEIR ATTRIBUTES: (18 Hours)
Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms- Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions.

UNIT III: TWO-DIMENSIONAL TRANSFORMATIONS AND VIEWING: (18 Hours)
Basic Transformations - Matrix Representations and Homogeneous Coordinates – Composite Transformations - Other Transformations – Window-to- Viewport Coordinate Transformation – Clipping Algorithms: Cohen-Sutherland Line Clipping and Sutherland- Hodgeman Polygon Clipping – Basic Modeling Concepts - Interactive Input Methods: Logical Classification of Input Devices – Interactive Picture-Construction Techniques.

UNIT IV: THREE-DIMENSIONAL CONCEPTS: (18 Hours)
Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification – Polygon Surfaces: Polygon Tables, Plane Equations and Polygon Meshes - Three-Dimensional Transformations: Basic, Other and Composite Transformations.

UNIT V: THREE-DIMENSIONAL VIEWING: (18 Hours)
Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection, Depth-Buffer and A-Buffer Methods –Wireframe Methods- Light Sources – RGB,CMY and HLS Color Models – Computer Animation: Design of its Sequences and Languages.

PRESCRIBED BOOKS:
1. D. Hearn and M.P. Baker,2005, Computer Graphics, 2nd Edition, Pearson Education, Prentice Hall, 19th Reprint.

REFERENCE BOOKS:
1. S. Harrington, 1987, Computer Graphics, 2nd Edition , McGraw-Hill Book Co.
2. W.M. Newman and R.F. Sproull ,1997, Principles of Interactive ComputerGraphics, 2nd Edition,Tata McGraw-Hill Publishing Co. Ltd.
3. D.P. Mukherjee, 1999, Fundamentals of Computer Graphics and Multimedia, 1st Edition,

Prentice-Hall of India Pvt. Ltd.
4. N. Krishnamurthy ,2002, Introduction to Computer Graphics, 1st Edition, Tata   McGraw-Hill
   Publishing Co. Ltd.
5. D.F.Rogers, 2001, Procedural Elements for Computer Graphics, 2nd Edition, Tata McGraw-Hill
   Publishing Co. Ltd.
6. Z. Xiang and R.A. Plastock, 2002, Computer Graphics, Schaum's Outline Series,Tata McGraw-Hill
   Publishing Co.

WEBSITES:
 1. http://www.cs.umd.edu/~mount/427/Lects/427lects.pdf
 2. http://www.cs.kent.edu/~farrell/cg05/lectures/

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