APPENDIX - L
MADURAI KAMARAJ UNIVERSITY
(University with Potential for Excellence)

B.Sc. Computer Science (Semester)

CHOICE BASED CREDIT SYSTEM
REVISED SYLLABUS
(With effect from 2018-19)

SCHEME OF EXAMINATIONS, REGULATIONS AND SYLLABUS

1. **Course Objectives:**

- To prepare the students to manage the software components in a computer independently and to be a Programmer.
- To motivate the students to take up higher studies in Computer Science and other streams.

2. **Eligibility for Admission:**

   A candidate should have studied +2 level Mathematics with Physics as one of the subjects in the 10 + 2 stream.

3. **Duration of the Course:**

   The students shall undergo the prescribed course of study for a period of not less than three academic year (Six semesters).

4. **Medium of Instruction :** English

5. **Subjects/ Structure of Course Study :** See Appendix – CS1

6. **Scheme of Examinations/ Structure of Question Paper:** : See Appendix - CS2

7. **Detailed Syllabus**: See Appendix – CS3

8. **Eligibility for the Degree:**

   i) A Candidate shall be eligible for the award of the degree on completion of the prescribed course of study and passing all the prescribed external examinations.

   ii) Attendance progress, internal examinations, conduct certificate from the Head of the Institution shall be required for taking the external examination.

   iii) The passing minimum and the ranking are as per the existing rule of the Choice Based Credit System for the affiliated college of the University.

Appendix – CS1

(Subject/Structure of Course Study)

Sem.	Subjects							Total Hours	Total Credits
I	T1(6) [3]	E1(6) [3]	CS1(4) [4]	CS2(6) [4]	AS1(4) [4]	SBS1(2) [2]	NME1(2) [2]	30	22
II	T2(6) [3]	E2(6) [3]	CS3(4) [4]	CS4(6) [4]	AS2(4) [4]	SBS2(2) [2]	NME1(2) [2]	30	22
III	T3(6) [3]	E3(6) [3]	CS5(4) [4]	CS6(4) [3]	CS7(4) [4]	AS3(4) [4]	SBS3(2) [2]	30	23
IV	T4(6) [3]	E4(6) [3]	CS8(4) [4]	CS9(4) [3]	CS10(4) [4]	AS4(4) [4]	SBS4(2) [2]	30	23
V	CS11(5) [4]	CS12(5) [4]	CS13(5) [4]	CS14(6) [4]	ES1(5) [4]	EVS(2) [2]	SBS5(2) [2]	30	24
VI	CS15(5) [4]	CS16(6) [4]	CS17(5) [4]	ES2(5) [4]	ES3(5) [5]	VE(2) [2]	SBS6(2) [2]	30	25
							Extension Activity		1
							TOTAL CREDITS		140

( ) – Number of Hours   [ ] – Number of Credits

T	-	Tamil	**E**	-	English
CS	-	Core Subject	**AS**	-	Allied Subject
SBS	-	Skill Based Subject	**NME**	-	Non Major Elective
ES	-	Elective Subject	**VE**	-	Value Education
EVS	-	Environmental Studies	**EA**	-	Extension Activities

S No	CODE	Subject	Hours	Credits	Internal Marks	External Marks
1	T1	Tamil	6	3	25	75
2	E1	English	6	3	25	75
3	CS1	Programming in C	4	4	25	75
4	CS2	**Lab 1** : Programming in C	6	4	40	60
5	AS1	Mathematical Foundations I	4	4	25	75
6	SBS1	**Lab 2**: Office Automation	2	2	40	60
7	NME1	Introduction to Computers and Office Automation	2	2	25	75
		Total	30	22		

II SEMESTER

S No	CODE	Subject	Hours	Credits	Internal Marks	External Marks
1	T2	Tamil	6	3	25	75
2	E2	English	6	3	25	75
3	CS3	Object Oriented Programming with C++	4	4	25	75
4	CS4	**Lab 3:** Object Oriented Programming with C++	6	4	40	60
5	AS2	Mathematical Foundations II	4	4	25	75
6	SBS2	**Lab 4:** Linux Programming	2	2	40	60
7	NME2	Introduction to Internet	2	2	25	75
		Total	30	22		

III SEMESTER

S No	CODE	Subject	Hours	Credits	Internal Marks	External Marks
1	T3	Tamil	6	3	25	75
2	E3	English	6	3	25	75
3	CS5	Data Structures and Computer Algorithms	4	4	25	75
4	CS6	**Lab 5** : Data Structures and Computer Algorithms	4	3	40	60
5	CS7	Digital Principles and Computer Organization	4	4	25	75
6	AS3	Resource Management Techniques	4	4	25	75
7	SBS3	**Lab 6:** Multimedia	2	2	40	60
		Total	30	23		

IV SEMESTER

S No	CODE	Subject	Hours	Credits	Internal Marks	External Marks
1	T4	Tamil	6	3	25	75
2	E4	English	6	3	25	75
3	CS8	Java Programming	4	4	25	75
4	CS9	**Lab 7:** Java Programming	4	3	40	60
5	CS10	System Software	4	4	25	75
6	AS4	Numerical Methods	4	4	25	75
7	SBS4	**Lab 8:** PHP Programming	2	2	40	60
8	EA	Extension Activities		1	100	
		Total	30	24		

V SEMESTER

S No	CODE	Subject	Hours	Credits	Internal Marks	External Marks
1	CS11	Relational Database Management Systems	5	4	25	75
2	CS12	Operating System	5	4	25	75
3	CS13	Software Engineering	5	4	25	75
4	CS14	**Lab 9** : Relational Database Management Systems	6	4	40	60
5	ES1	1. Client Server Computing 2. Android Programming 3. Theory of Computation	5	4	25	75
6	EVS	Environmental Studies	2	2	25	75
7	SBS5	**Lab 10:** Python Programming	2	2	40	60
		Total	30	24		

VI SEMESTER

S No	CODE	Subject	Hours	Credits	Internal Marks	External Marks
1	CS15	Data Communication and Computer Networks	5	4	25	75
2	CS16	**Lab 11** : Web Technology	6	4	40	60
3	CS17	Data Mining	5	4	25	75
4	ES2	1. Computer Graphics 2. Compiler design 3. Information Security	5	4	25	75
5	ES3	Project Work / Viva-Voce	5	5	25	75
6	VE	Value Education	2	2	25	75
7	SBS6	Quantitative Aptitude	2	2	25	75
		Total	30	25		

Non-Major Elective Courses to be offered by the Department of Computer Science
to the students other than B.Sc. Computer Science

1. **NME1** - Introduction to Computers and Office Automation

2. **NME2** - Introduction to Internet

Appendix – CS2

Scheme of Examination /Question Paper
Pattern Scheme of Evaluation

Theory Subjects

Question Paper Pattern

Time: 3 Hours   **Max. Marks: 75**

Part – A
Answer all the questions   (10*1=10)

Ten Questions, two questions from each Unit: *Multiple Choice Questions*

Part – B
Answer all the questions   (5*7=35)

Five Questions, one question set from each Unit: *Either ...Or... type*

Part – C
Answer any three questions   (3*10=30)

Five Questions, one question from each Unit

Practical Subjects:

A candidate has to prepare Algorithm / Procedure for both the questions covering both the parts. The following list of parameters is taken into account for the evaluation of practical examination.

Total Marks: 100 (Internal: 40 marks, External: 60 Marks)

Parameters

For Internal Marks:

i.	Average of two tests:	25
ii.	Record Work:	10
iii.	Seminar / Quiz / Viva:	5
	Total:	**40**

For External Marks:

i.	Aim, Procedure / Algorithm and Program:	15
ii.	Coding and Compilation :	10
iii.	Debugging :	15
iv.	Results :	10
v.	Viva:	10
	Total:	**60**

Note: The External Examiner can fix other exercises also other than those found in the list *(Syllabus)*
in consultation with the Internal Examiner without violating the scope of the prescribed syllabus.

For Project Work:

The combined project shall be undertaken by the students as a team of two. The project should be done in the college lab. The following list of parameters is taken into account for the evaluation of Project work and Viva-voce.
Total Marks: 100 (Internal: 25 marks,   External: 75 Marks)

Parameters:

For Internal Marks:	Two review meetings	: 2 x 7.5	= 15 Marks
	Overall Performance	:	= 10 Marks
For External Marks:	Project Report	:	= 25 Marks
	Project Demo & Presentation	:	= 30 Marks
	Viva-Voce	:	= 20 Marks

Appendix – CS3 (Detailed Syllabus)
CS1: Programming in C (4 Hours - 4 credits)

Unit I:
Overview of C: History of C – Importance of C – Basic Structure of C Programs – Programming Style – Character Set – C Tokens – Keywords and Identifiers – Constants, Variables and Data Types – Declaration of Variables – Defining Symbolic Constants – Declaring a variable as a constant – overflow and underflow of data – Operators and Expressions: Arithmetic, relational, logical, assignment operators – increment and decrement operators, conditional operators, bitwise operators, special operators – Arithmetic Expressions- Evaluation of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical functions.

Unit II:
Managing I/O Operations: Reading and Writing a Character – Formatted Input, Output – Decision Making & Branching: if statement - if else statement - nesting of if else statements - else if ladder – switch statement – the ?: operator – goto statement – the while statement – do statement – the for statement – jumps in loops.

Unit III:
Arrays: One-Dimensional Arrays – Declaration, Initialization – Two-Dimensional Arrays – Multi-dimensional Arrays – Dynamic Arrays –

Initialization. Strings: Declaration, Initialization of string variables – reading and writing strings – string handling functions.

Unit IV:

User-defined functions: Need – multi-function programs – elements of user defined functions – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion – passing arrays, strings to functions – scope visibility and life time of variables. Structures and Unions: Defining a structure – declaring a structure variable – accessing structure members – initialization – copying and comparing – operation on individual members – array of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields.

Unit V:

Pointers : Understanding Pointers, Accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointer – chain of pointers
– pointer increments and scale factors – pointers and character strings – pointers as function arguments – pointers and structures. Files: Defining, opening, closing a file – IO Operations on files – Error handling during IO operations – command line arguments.

Text Book:

Programming in ANSI C, E.Balagurusamy, 7th Edition, Tata McGraw Hill Publishing Company, 2017.

Unit I	:	Chapters 1 (Except 1.3-1.7, 1.10-1.12), 2 (Except 2.9, 2.13), 3 (Except 3.13)
Unit II	:	Chapters 4 – 6
Unit III	:	Chapters 7, 8 (Except 8.5, 8.6, 8.7, 8.9, 8.10)
Unit IV	:	Chapters 9 (Except 9.20), 10
Unit V	:	Chapters 11 (Except 11.8, 11.10, 11.12, 11.14, 11.15, 11.17), 12 (Except 12.6)

Reference Books:
1. Programming with C, Schaum's Outline Series, Gottfried, Tata McGraw Hill, 2006
2. Programming with ANSI and Turbo C , Ashok N.Kamthane , Pearson Education, 2006
3. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000.
4. Kanetkar Y., Let us C, BPB Pub., New Delhi, 1999.

CS2: Lab 1: Programming in C
(6 Hours - 4 credits)
Section A
1. Write a C Program to find the sum of digits
2. Write a C Program to check whether a given number is Armstrong or not
3. Write a C Program to check whether a given number is Prime or not
4. Write a C Program to generate the Fibonacci series
5. Write a C Program to display the given number is Adam number or not
6. Write a C Program to print reverse of the given number and string
7. Write a C Program to find minimum and maximum of 'n' numbers using array
8. Write a C Program to arrange the given number in ascending order
9. Write a C Program to add, subtract and multiply two matrices
10. Write a C Program to calculate NCR and NPR

Section B
1. Write a C Program to find the grade of a student using else if ladder
2. Write a C Program to implement the various string handling functions
3. Write a C Program to create an integer file and display the even numbers only
4. Write a C Program to calculate quadratic equation using switch-case
5. Write a C Program to implement the various string handling function
6. Write a C Program to generate student mark list using array of structures
7. Write a C Program to create and process the student mark list using file
8. Write a C Program to create and process pay bill using file
9. Write a C Program to create and process inventory control using file
10. Write a C Program to create and process electricity bill using file

AS 1: Mathematical Foundations I
(4 Hours – 4 Credits)

Unit I:
The Foundations: Logic and Proofs: Propositional logic – Applications of Propositional logic – Propositional equivalences – (Exclude Propositional satisfiability, Applications of satisfiability, Solving satisfiability problems, and its related problems) – Predicates and Quantifiers – Rules of inference.

Unit II:
Relations: Relations and their properties – Representing relations – Closures of relations – Partial orderings (Theorems statement only; Exclude lexicographic ordering - Exclude Lattices)

Unit III:
Counting: The basic of counting - The pigeonhole principle – Permutation and Combinations – Applications of recurrence relations – Solving recurrence relations – Divide and Conquer algorithms and recurrence relations. (All theorems and Results statement only)

Unit IV:
Graphs: Graphs and Graphs models, (Excluding Biological networks; Tournaments; all its related examples and problems) – Graph terminology and special types of graphs – Representing graphs and Graph isomorphism – Connectivity (paths – connectedness in undirected graphs – paths and isomorphism – counting paths between vertices) – shortest path problems.

Unit V:
Matrices: **Introduction – operations – inverse – Rank of a matrix, solution of simultaneous linear equations – Eigen values and Eigen Vectors.**

Text Books:
1. Discrete Mathematics and its applications, Seventh Edition, Kenneth.H.Rosen, McGrawHill Publishing Company, 2012.
2. Discrete Mathematics, M.Venkataraman, N.Sridharan and N.Chandrasekaran, The National Publishing Company, 2009.

Unit I	:	Textbook 1	Chapter 1: Sections: 1.1, 1.2, 1.3, 1.4, 1.6
Unit II	:	Textbook 1	Chapter 9: Sections: 9.1, 9.3, 9.4, 9.5, 9.6
Unit III	:	Textbook 1	Chapter 6: Sections: 6.1, 6.2, 6.3
			Chapter 8: Sections: 8.1, 8.2, 8.3 (Pages: 527 -529 only)
			(Exclude algorithms and relations, on page 507 and its related problems)
Unit IV	:	Textbook 1	Chapter 10: Sections: 10.1, 10.2, 10.3, 10.4, 10.6)
Unit V	:	Textbook 2	Chapter 6 :Sections :6.1 to 6.5, and 6.7)

Reference Books :
1.Modern Algebra - S.Arumugam and A. Thangapandi Isaac, Scitech publications 2005.
2. Invitation to Graph Theory-S.Arumugam and S.Ramachandran, Scitech Publications,2005, Chennai.
3. Discrete Mathematical Structures with applications to Computer Science - Tremblay and Manohar, McGraw Hill,1997.

WORD

SBS1: Lab 2: Office Automation
(2 Hours – 2 Credits)

1. Open a Word document to prepare your **Resume** by performing the following operations.
   (a) Formatting the Text- Alignment & Font style
   (b) Page setup (margin alignment, page height & width)
2. Create a student mark sheet using table, find out the total & average marks and display the result.
3. Design an invitation of your course inauguration function using different fonts, font sizes, bullets and Word Art/ Clip Art

4.   Mail Merge Concept
        (a) Prepare an invitation and to be sent to specific addresses in the data source.

EXCEL

1. Create suitable work sheet with student mark details and use Data sort to display results and make out a suitable chart.
2. Prepare salary bill in a worksheet showing Basic Pay, DA, HRA, Gross salary, PF, Tax and Net salary using suitable Excel Functions.

POWER POINT

1. Create a power point presentation to explain various aspects of your college using auto play.

2 Create a power point presentation to explain the sales performance of a company over a period of five years. Include slides covering the profile of the company, year wise sales and graph with gridlines, legends and titles for axes. Use Clip Art and animation features.

ACCESS

1. Create a table for storing marks of 10 students. The fields of the table are given below: Reg. No., Name, Mark1, and Mark2, Mark3, Test average (Best Two /2), Assignment, Seminar and Total marks (Test average + Assignment + Seminar) The fields 'Mark1', 'Mark2', 'Mark3' should not allow the user to enter a mark greater than 25 and should display proper message in such case. Similar constraint for the field 'Assignment' is 5 marks and for the field 'Seminar', it is 10 marks.

2. Create a table showing names of authors of at least 10 different books, title of books, the prices of these books, name of publishers and year of publication. Also create Select, Action and Cross-tab queries to display the records from this table meeting the criteria used in these queries.
3. Create a form to enter the data directly into this form. The fields required are: Basic Pay, DA, HRA, Gross salary, PF, Income tax and Net salary.
4. Create a report that displays the customer name, address, phone number, Item code, product quantity of the customers whose orders have been pending for over a month.

NME1: Introduction to Computers and Office Automation
(2 Hours – 2 Credits)

Unit I:

Introduction to Computer and Information Technology: History, Computer system concepts-Computer system characteristics- Capabilities and limitations-Types of computers- Generations. **Computer organization and working:** Introduction-The Control UnitALU- Memory-Read only memory (ROM).

Unit II:
Input Devices: Introduction- Keyboards-Mouse-Joysticks-Optical Recognition input- Scanners-Bar coders-Digital camera-MICR-Card reader-Web Cameras-Light pens-Trackball- Touch screens-Touch pad-Digitizer-Voice input-Voice recognizers. **Output Devices**: Introduction-Monitors and Displays- Multimedia Projector-Printers-Graphics Output Devices-Plotters-Flatbed Plotters-Drum Plotters. **Storage Devices:** Introduction- Hard Disk Drives –CD-ROMs and DVDs – Magnetic tape –Erasable disks.

Unit III:
Microsoft Office 2007 and Word Processing: Introduction to Microsoft Office 2007 - Microsoft Word Screen. **Microsoft Word**: Working with Document in Word 2007 – Introduction – saving the file – Formatting, Alignment of text, Applying fonts-Spell checking- Borders and shading – Closing of the file, Editing document, Autocorrect-Auto format-Find and Replace, Page numbering, header and footer- Footnotes and endnotes- splitting panes-Tiling of the documents-using mail merge in Word 2007.

Unit IV:
Microsoft Office   Excel 2007: Understanding Spreadsheets-Creating a Worksheet in Microsoft Excel 2007- Copying formula – Styles –functions in Excel – Using Auto calculate
–References –Sum, Average functions.
Unit V:
Creating Charts in Excel 2007-Auditing a workbook – Comments Inserting – Function wizard-Goal seeking- Typing with Auto fill- Formatting numbers and Labels – changing the size of Rows and columns- Add or Remove a sheet – Protect a worksheet-Applying themes.
Text Book:
Learning computer fundamentals, MS Office and Internet & Web
technology, Dinesh Maidasani, Firewall Media, Third Edition, 2014.

        Unit I :   Section A-1, 2
        Unit II :   Section A- 3, 4, 5
        Unit III :   Section B- 2, 3
        Unit IV :   Section B- 4 (up to Functions in Excel)
        Unit V -:   Section B- 4(From Creating Charts in Excel)

Reference Books:
1. A Beginners Guide to Computers – Alexis Leon & Mathews Leon-Vikas Publishing House Pvt. Ltd., 2001.
2. Fundamentals of Computers, P. Mohan, Himalaya Publishing House, Revised Edition, 2010.
3. Fundamentals of Computers, V. Rajaraman, PHI Publication, Fifth Edition, 2010.

CS3: Object Oriented Programming with C++

(4 Hours - 4 credits)

Unit I:

Software Crisis – Software Evolution – Basic Concepts of Object-Oriented Programming – Benefits of OOP – Object-Oriented Languages - Applications of OOP – Application of C++ - Structure of a C++ Program – Tokens – Keywords – Identifiers – Basic Data Types – User- defined Data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables –Reference variables – Operators in C++ - Manipulators – Type cast operator – Expressions and their types-Implicit conversions – Control structures – The main function – Function prototyping – inline functions – Function overloading.

Unit II:

Specifying a class – Defining member functions – Making an outside function inline – Nesting of member functions – Private member functions – Array within a class – Memory allocation for objects – Static data members – Static member functions – Array of objects - Objects as function arguments – Friendly functions – Returning objects – Constant member functions – Constructors – Parameterized constructor – Multiple constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy constructor – Destructors.

Unit III:

Defining operator overloading – Overloading unary operators – Overloading binary operators
– Overloading binary operators using friend function – Rules for overloading operators - Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritance – Hierarchical inheritance – Hybrid inheritance
- Virtual base classes – Constructors in derived class – Member classes: Nesting of classes.

Unit IV:

Pointer to objects – this pointer – Pointers to derived classes – Virtual functions – Pure virtual functions – C++ Stream classes – Unformatted I/O operations – Managing output with manipulators.

Unit V:
Classes of file stream operations – Opening and Closing files – Detecting end of file – More about open() function – File modes, File pointers and their manipulation – Sequential input and output operations – Command-line arguments- Templates: class templates and function templates.

Text Book:
Object Oriented Programming with C++**,** E. Balagurusamy, Sixth Edition**-**2013, McGraw Hill Education (India) Private Limited, New Delhi.

Unit I	:	Chapter 1 (Except 1.3, 1.4), Chapter 2 (Only), Chapter 3 (Except 3.20, 3.21, 3.22), Chapter 4
Unit II	:	Chapter 5 (Except 5.18, 5.19), Chapter 6 (Except 6.8, 6.9, 6.10)
Unit III	:	Chapter 7, Chapter 8
Unit IV	:	Chapter 9, Chapter 10
Unit V	:	Chapter 11 (Except 11.8), Chapter 12 (Only 12.2, 12.3 and 12.4)

Reference Books:

1. C++ - The Complete Reference, Herbert Schildt, TMH, 1998.
2. C++ How to Program, Paul Deitel, Harvey Deitel, PHI, Ninth edition (2014).
3. Ashok N.Kamthane, Object Oriented Programming with ANSI & Turbo C ++, Pearson Education, 2006.
4. Object-Oriented Programming With C++, Poornachandra Sarang, 2nd Edition, PHI Learning Private Limited, New Delhi, 2009.
5. Object-Oriented Programming Using C++, Alok Kumar Jagadev, Amiya Kumar Rath and Satchidananda Dehuri, Prentice-Hall of India Private Limited, New Delhi, 2007.

CS4: Lab 3: Object Oriented Programming with C++
(6 Hours - 4 credits)
Section A

1. Printing Prime numbers between two given numbers.
2. *Printing 3 digit numbers as a series of words. (Ex. 543 should be printed out as Five Four Three).*
3. Finding area of geometric shapes using function overloading.
4. Inline functions for simple arithmetic operations.
5. Demonstrating the use of Pre-defined Manipulators.
6. Demonstrating the use of friend function.
7. Creating student mark list using array of objects,

8. Demonstrating constructor overloading.
9. Overloading the unary – operator.
10. Demonstrating single inheritance.
11. Demonstrating the use of **this** pointer.
12. Designing our own manipulator.
13. Illustrating function templates.
14. Illustrating class templates.

Section B

1. Overloading the binary + operator.
2. Demonstrating Multiple inheritance.
3. Demonstrating Multilevel inheritance.
4. Demonstrating Hierarchical inheritance.
5. Demonstrating Virtual functions.
6. Processing mark list using binary file.
7. Count number of objects in a file.
8. Demonstrating the use of Command-line arguments.

AS2: MATHEMATICAL FOUNDATIONS II
(4 Hours – 4 Credits)

Unit I:
Introduction to statistics – primary and secondary data – classification, tabulation and Diagrammatic Representation of statistical data – Bar-charts, Pie-diagrams' – Graphical Representation of data – Histograms, Frequency polygon, Ogives.

Unit II:
Measures of dispersion – characteristics – coefficient of dispersion - Coefficient of variation
– Moments – skewness and kurtosis – Pearson's coefficient of skewness - Bowley's coefficient of Skewness – Coefficient of skewness based upon moments.

Unit III:
Simple correlation – Karl Pearson's coefficient of correlation – correlation coefficient for A bivariate frequency distribution – Rank correlation – Regression – lines of regression – Properties of regression coefficient.

Unit IV:
Events and sets – sample space – concept of probability – addition and multiplications Theorem on probability – conditional probability and independence of evens – Baye's Theorem – concept of random variable – Mathematical Expectation.

Unit V:
Concept of sampling distributions – standard error – Tests of significance based on t, Chi- square and F distributions with respect to mean, variance.

Text Book:
Statistical Methods, S.P.Gupta, Sultan chand and sons, 2004.

Unit I : Chapters 1, 2.2, 2.2.1, 2.2.2, 2.2.3 – 2.2.5
Unit II : Chapters 7 and 8
Unit III : Chapters 9, 9.1, 9.2, 9.3, 10, 10.1, 10.2, 10.2.1, 10.2.2, 10.2.3, 10.3
Unit IV : Chapter 16
Unit V : Chapters 18.3, 18.4, 18.7.1, 18.7.2, 19

Reference Books:
1.Statistics, Dr. S.Arumugam and A.Thangapandi Issac, New Gamma Publication house, 2002.
2.Kishor S.Trivedi - Probability and statistics with reliability queuing and
   Computer Science Applications - Prentice Hall of India(P) Ltd., New
   Delhi - 1997.
3. Discrete Mathematics - Seymour Lipschutz, Marc Lars Lipson Schaum's
Outlines- by, 3rd Edition., Tata McGraw Hill, Education Pvt. Ltd., New Delhi. 5th
Reprint 2012.

SBS2: Lab 4: Linux Programming
(2 Hours – 2 Credits)
Section-A

1. Write a Linux script to find the number of users who have logged in.
2. Write a Linux script to see the current date, user name and current directory.
3. Write a Linux script to print the numbers 5,4,3,2,1 using While loop.
4. Write a Linux script to set the attributes of a file.
5. Write a Linux script to convert lowercase to uppercase using tr utility.
6. Write a Linux script to copy and rename a file.
7. Write a Linux script to add 5 numbers and find the average.
8. Write a Linux script to convert a decimal number to hexadecimal conversion.
9. Write a Linux script to find the factorial of a number.
10. Write a Linux script to check for palindrome.

Section-B

1. Write a Linux script to display Hello World in Bold, Blink effect and
   in different colors like red, green etc.
2. Write a Linux script to display a multiplication table.

3. Write a Linux script to perform arithmetic operations using case.
4. Write a Linux script to add two real numbers.
5. Write a Linux script to display the

    following pattern: 1
    22
    333
    4444
    55555

6. Write a Linux script to find the sum of digits and reversing of a given number.
7. Write a Linux script to display the student mark details.
8. Write a Linux script to prepare electricity bill.
9. Write a Linux script to sort the numbers in ascending order.
10. Write a Linux script

    (i) To create and append a file
    (ii) (ii) To compare two files.

NME2: Introduction to Internet
(2 Hours – 2 Credits)

Unit I:
Introduction to internet: Internet- Growth of Internet and ARPANet - Owners of the Internet -Anatomy of Internet – History of WWW - Basic Internet Terminologies – Net etiquette - Internet Applications - Commerce on the Internet – Governance on the Internet - Impact of Internet on Society.**TCP/IP Internet Technology and Protocols:** Packet Switching Technology - Internet Protocols - TCP/IP – Router - Internet Addressing Scheme- Machine Addressing - E-mail Addresses – Resource Addresses.

Unit II:
Interconnectivity: Connectivity types - Setting up a connection - Hardware requirements- Selection of a modem - Software requirements – Internet accounts by ISP-ISDN-Protocol options-Service options. **Internet Network:** Network Definition-Common terminologies – Node - Host- Workstation -Network Administrator - Network security - Network Components – Servers-client Server-Communication Media - Types of Networks - Addressing in Internet – DNS - Network topologies – Ethernet – FDDI - ATM.

Unit III:
Browsers and Search engines: Browsers - What is a browser? – Parts of a browser window
-Running a browser - working with a Browser.**Search engines**: What is search engine? - Types of search engines - Search and meta search engines.

Unit IV:
E-mail: E-mail - E-mail Networks and Servers - E-mail Protocols - Structure of E-mail - Attachments – E-mail Clients - E-mail Clients - web based E-mail- Address book – Signature File.

Unit V:
HTML Programming Basics: Introduction to HTML – HTML browsers - Different versions of HTML-HTML tags - Document overview - Header elements - Section headings - Block hedings - Lists-Inline elements – Images - working with Tables, Forms, Frames.

Text book:
Internet Technology and Web design, Ramesh Bangia, Firewall Media, (An imprint of Lakshmi Publications Pvt. Ltd.), Third Edition, 2011.

Unit I	:	Chapters 1 and 2
Unit II	:	Chapters 3 and 4
Unit III	:	Chapter 5(5.6), Chapter 8(8.11 &8.13)
Unit IV	:	Chapter 5 (5.1) & Chapter 6
Unit V	:	Chapter 9

Reference Books:
1. The Internet Book, Douglas E. Comer, Fourth Edition, PHI Learning Pvt. Ltd. , New Delhi, 2009.
2. Using the Internet the Easy Way, Young Kai Seng, Minerva Publications, First Edition, 2000.
3. Fundamentals of Information Technology By Alexis Leon and Mathews Leon, Vikas Publishing House Pvt. Ltd., Revised Edition.

CS5: Data Structures and Computer Algorithms
(4 Hours - 4 credits)

Unit I
Introduction and Overview – Introduction – Basic Terminology; Elementary Data Organization – Data Structure Operations – Complexity of Algorithms – Other Asymptotic Notations for Complexity of Algorithms.

Arrays – Introduction – Linear Arrays – Representation – on Linear Arrays in Memory – Traversing Linear Arrays – Inserting and Deleting – Sorting: Bubble Sort – Searching; Linear Search – Binary Search – Multidimensional Arrays. Linked List – Introduction – Linked Lists – Representation of Linked Lists in Memory – Traversing a Linked List – Memory Allocation; Garbage Collection – Insertion into a Linked List – Deletion from a Linked list.

Unit II
Stack: Introduction – Stacks – Array Representation of Stacks – Linked Representation of Stacks – Recursion - Tower of Hanoi - Implementation of Recursive Procedures by Stacks - Queue –Linked Representation of Queues – D – Queue

Unit III
Trees – Introduction – Binary Trees – Representing Binary Trees in memory – Traversal Binary Tree – Traversal algorithms using Stacks – Header Nodes; Threads – Binary Search Trees – Searching and Inserting in Binary Search Trees – Deleting in a Binary Search Trees.

Graphs – Introduction – Graph Theory - Terminology – Sequential Representations of Graph
– Adjacency Matrix; Path Matrix – Warshall's Algorithm; Shortest Paths.

Unit IV:
Algorithms: Introduction: What is an Algorithm? – Algorithm Specification – Performance Analysis – Divide and Conquer: General method – Binary Search – Finding the maximum and minimum – Merge Sort – Quick Sort – Selection – Strassen's Matrix Multiplication.

Unit V:
The Greedy Method: General Method – Knapsack problem – Job Sequencing with deadlines – **Minimum cost spanning trees:** Prim's Algorithm – Kruskal Algorithm – Optimal Storage on tapes – Optimal merge patterns – single source shortest path.
Text Books:

1. Data Structures – Seymour Lipschutz –Tata McGraw-Hill - 2006
 2. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj
        Sahni, Galgotia Publications Pvt. Ltd, New Delhi

Unit I	: Textbook 1	Chapter 1 (1.1 to 1.4) , Chapter 2 (2.5 , 2.6), Chapter (4.1 to 4.9), Chapter 5 (5.1 to 5.8)
Unit II	: Textbook 1	Chapter 6 (6.1 to 6.4, 6.7 to 6.12)
Unit III	: Textbook 1	Chapter 7 (7.1 to 7.9)
Unit IV	: Textbook 2	Chapter 1 (Except 1.4), Chapter 3 (Except 3.2, 3.9)
Unit V	: Textbook 2	Chapter 4 (Except 4.2, 4.6.3)

Reference Books:
1. Data Structure and Algorithm Analysis in C – Mark Allen Weiss – Second Edition, Addison Wesley publishing company, 1997.

2. C and C++ Programming Concepts and Data Structures -

P.S.Subramanyam - BS Publications, 2013.
3. Data Structures and Algorithms- Alfred V.Aho, John E.Hopcraft and Jeffrey D.Ullman - Pearson Education - Fourteenth Impression - 2013.

CS6: Lab 5: Data Structures and Computer Algorithms
(4 Hours – 3 credits)
Section A
(Programs from Data Structures Using C)
1. Implementing Stack as an array.
2. Implementing Stack as a linked list.
3. Convert Infix expression to Postfix expression using stack.
4. Convert Infix expression to Prefix expression using Stack.
5. Implementing Queue as an Array.
6. Implement Queue as a linked list.
7. Binary tree traversals.
8. Implement Binary Search Tree.
Section B
(Programs from Computer Algorithms Using C++)
1. Linear Search
2. Binary Search
3. Bubble Sort
4. Insertion Sort
5. Merge Sort
6. Quick Sort
7. Selection Sort

Reference Book:

C and C++ Programming concepts and Data Structures, P.S.Subramanyam, BS Publications, 2013.

CS7: Digital Principles and Computer Organization
(4 Hours – 4 Credits)

Unit I:
Number Systems and Codes: Binary Number system – Binary to decimal – decimal to binary – hexa decimal – ASCII code – Excess-3 Code – Gray code.
Digital Logic: The Basic Gates – NOT, OR, AND - Universal Logic Gates – NOR, NAND.

Unit II:

Combinatorial Logic Circuits: Boolean Laws and Theorems. - Sum of Products method - Truth table to Karnaugh Map – Pairs, Quads, Octets – Don't Care Conditions- Product-of sums method -Product-of sums Simplifications.

Data Processing Circuits: Multiplexers – Demultiplexers-1-of-16 Decoder – BCD-to- decimal Decoders – Seven-segment Decoders – Encoders – Exclusive-OR Gates- Parity Generators and Checkers.

Unit III:

Arithmetic Circuits: Binary Addition- Binary Subtraction – 2'S Complement Representation - 2's Complement Arithmetic – Arithmetic Building Blocks-Adder- Subtractor

Flip-Flops-RS Flip-Flops-Gated Filp-Flops-Edge-triggered RS Flip-Flops-Edge-triggered D Flip-flops--Edge-triggered JK Flip-Flops-JK Master Slave Flip-flops.

Unit IV:

Types of Registers – Serial In-Serial Out – Serial In-Parallel Out – Parallel In-Parallel Out – Ring Counter –Ripple Counter – Synchronous Counter.

Unit V:

Instruction Codes – Computer Register – Computer Instructions – Timing And Control – Instruction Cycle.
        Control Memory – Address Sequencing – General Register Organization – Stack Organization – Instruction Formats – Data Transfer and Manipulations -Addressing Modes – Program Control.

Text Books:
1. Digital Principles and Applications – Donald P Leach, Albert Paul Malvino, Goutam Saha, 8th edition , McGraw-Hill Education, 3rd reprint 2015.
2. Computer System Architecture, M. Morris Mano, Pearson Education,3rd Edition- 2007

Unit I	: Textbook 1	Chapters 5: (5.1 to 5.9) and 2: (2.1 to 2.3)
Unit II	: Textbook 1	Chapters 3: (3.1 to 3.8) and 4: (4.1 to 4.7)
Unit III	: Textbook 1	Chapters 6: (6.1 to 6.8) and 8: (8.1 to 8.5,8.8)
Unit IV	: Textbook 1	Chapters 9: (9.1 to 9.6) and 10: (10.1,10.3)
Unit V	: Textbook 2	Chapter 5:(5.1 to 5.5) ,7:(7.1,7.2) and Chapter 8 (8.1 to 8.7)

Reference Books:
1. Digital Design, R.Anantha Natarajan, PHI Learning, 2015.
2. Principles of Digital Electronics, K.Meena, PHI Learning, 2013.
3. Digital Computer Fundamentals, Thomas C. Bartee TMH 2007.

4. Digital Circuits and Design, S. Salivahanan and S. Arivazhagan, Vikas Publishers, 2005.
5. Computer Organization and Architecture, V.Rajaraman and T.Radhakrishnan, PHI learning, 5th Print, 2015.
6. Computer Organization, Carl Hamacher Zvonko Vranesic Safwat Zaky, McGraw Hill Education, 5th Edition, 11th reprint, 2015.
7. Computer Organization and Architecture, Smruti Ranjan Sarangi, McGraw Hill Education.

AS3: Resource Management Techniques
(4 Hours – 4 Credits)

Unit I:
Development of OR: Definition of OR – Modeling - Characteristics and Phases - Tools, Techniques & Methods - scope of OR.

Unit II:
Linear Programming Problem: Formulation - Slack & surplus variables - Graphical solution of LPP.

Unit III:
Simplex Method: Computational Procedure - Big-M method - Concept of duality in LPP - Definition of primal dual problems - General rules for converting any primal into its dual.

Unit IV:
Duality Theorems: (without proof) Primal dual correspondence - Duality and Simplex method - Mathematical formulation of assignment problem - Method for solving assignment problem.

Unit V:
Mathematical formulation of Transportation Problem: Methods for finding IBFS for the Transportation Problems.

Text Book:

Operations Research, S.D.Sharma, Kedar Nath Ram Nath & Co.

Unit I	:	Chapter-1(1.1, 1.2, 1.4,1.,1.8,1.9,1.10,1.11)
Unit II	:	Chapter-3 (3.1, 3.2, 3.3, 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.4,3.5)
Unit III	:	Chapter-5 (5.1, 5.2, 5.2.1, 5.3,5.4,5.5.4)
		Chapter- 7 (7.1,7.2,7.3,7.4)

Unit IV	:	Chapter-7 (7.5) (Statements only); 7.6, 7.7
		Chapter 11(11.2,11.3,11.4)
Unit V	:	Chapter-12 (12.2 to 12.8)

Reference Books:

1. Operation Research, Nita H.Shah, Ravi M.Gor and Hardik soni,Prentice-Hall of India Pvt. Ltd., New Delhi 2008.

2. Operation Research, R.Sivarethinamohan, Tata McGraw Hill,

2005. 3.Operations Research – An Introduction by Hamdy A.Taha. Ninth Edition,

Dorling Kindersley Pvt. Ltd., Noida, India, 2012.

SBS3: Lab 6: Multimedia
(2 hours - 2 Credits)

Photoshop
1. Basic tools used in Photoshop.
2. Design an image by cutting the objects from 3 files and organize them in a single file and apply feather effects.
3. Design an image by applying mirror effect.
4. Design an image by extracting flower only from given photographic image
5. Design an image by applying Text and Transform Tool.
6. Design an image by using patch or healing brush tool to remove damaged parts of an image.
7. Design an image by applying Color Balance to change the color of an image.
8. Design an image by applying Lighting effect Filter.
9. Design an image by applying Blending options to make a text effect.
10. Design an image by applying rainbow effect.
11. Design an image by applying text masking effect.
12. Design a college id card using any tools.
13. Design a banner for your college with images and text.

Flash
1. Basic tools used in Flash.
2. Develop a Flash application using motion tween.
3. Develop a Flash application using shape tween.
4. Develop a Flash application for ball bouncing using motion guide path.
5. Develop a Flash application for masking effect.
6. Develop a Flash application using layer based animation.
7. Develop a Flash application to represent the growing moon
8. Write action script to play and stop an animation.
9. Create an appealing animation movie of your choice combining both Motion tweening and Shape tweening. Also add appropriate sound effects.

CS8: Java Programming
(4 Hours – 4 Credits)

Unit 1

FUNDAMENTALS OF OBJECT – ORIENTED PROGRAMMING: Introduction, Object Oriented paradigm, Basic Concepts of OOP, Benefits of OOP, Applications of OOP, Java features: **OVERVIEW OF JAVA LANGUAGE:** Introduction, Simple Java program structure, Java tokens, Java Statements, Implementing a Java Program, Java Virtual Machine, Command line arguments. **CONSTANTS, VARIABLES & DATA TYPES:** Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Value to Variables, Scope of variables, Symbolic Constants, Type casting, Getting Value of Variables, Standard Default values; **OPERATORS & EXPRESSIONS**.

Unit II

DECISION MAKING & BRANCHING: Introduction, Decision making with if statement, Simple if statement, if. Else statement, Nesting of if. else statements, the else if ladder, the switch statement, the conditional operator. **DECISION MAKING & LOOPING**: Introduction, The While statement, the do-while statement, the for statement, Jumps in loops.

CLASSES, OBJECTS & METHODS: Introduction, Defining a class, Adding variables, Adding methods, Creating objects, Accessing class members, Constructors, Method overloading, Static members, Nesting of methods;

Unit III

INHERITANCE: Extending a class, Overloading methods, Final variables and methods, Final classes, Finalizer methods, Abstract methods and classes; **ARRAYS, STRINGS AND VECTORS:** Arrays, One-dimensional arrays, Creating an array, Two – dimensional arrays, Strings, Vectors, Wrapper classes

INTERFACES: MULTIPLE INHERITANCE: Introduction, Defining interfaces, Extending interfaces, Implementing interfaces, Assessing interface variables;

Unit IV

MULTITHREADED PROGRAMMING: Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Lifecycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the 'Runnable' Interface. MANAGING ERRORS AND EXCEPTIONS: Types of errors : Compile-time errors, Runtime errors, Exceptions, Exception handling, Multiple Catch Statements, Using finally statement

Unit V

PACKAGES: Introduction, Java API Packages, Using System Packages, Naming conventions, Creating Packages, Accessing a Package, using a Package.

MANAGING INPUT/OUTPUT FILES IN JAVA: Introduction, Concept of Streams, Stream classes, Byte Stream Classes, Input Stream Classes, Output Stream Classes, Character Stream classes: Reader stream classes, Writer Stream classes, Using Streams, Reading and writing files.

Text Book

Programming with JAVA, A Primer, E.Balagurusamy, 5th Edition, McGraw-Hill Company, 2015

Unit I	:	Chapters 1 - 5
Unit II	:	Chapters 6 ,7 and 8.1-8.10
Unit III	:	Chapter 8.11-8.18, Chapters 9 and 10
Unit IV	:	Chapter 12 and 13
Unit V	:	Chapter 14,11.1-11.7 and 16

Reference Books:

1.Programming in Java, Sachin Malhotra, Oxford University Press
2.Programming with Java, John R. Hubbard, Second Edition, Schaum's outline
   Series, Tata McGraw-Hill Company.
3.Java TM: How to Program, Deitel & Deitel, PHI, 2007
4. Java 2- The Complete Reference, Herbert Scheldt , 5th Edition,
   McGraw Hill Education (India) Private Limited,2002

CS9: Lab 7: Java Programming
(4 Hours – 3 Credits)

Section: A

Write Programs in Java for the following:

1. To implement a simple temperature conversion program.
2. To perform addition and subtraction of complex numbers using class and objects.
3. To perform volume calculation using method overloading.
4. Using command line arguments, test if the given string is palindrome or not.
5. String manipulation using String Methods (Use of any five String methods are preferred).
6. Write a program to fill names into a list .Also, copy them in reverse order into another list. If the name contains any numeric value throw an exception Invalid Name
7. Program to demonstrate the use of any two built-in exceptions in Java.

Section: B

8. To perform multiplication of matrices using class and objects.
9. Using multilevel inheritance process student marks.
10. Implement multiple inheritance for payroll processing.
11. Implement interface for area calculation for different shapes.
12. Create a package called Arithmetic that contains methods to deal with all arithmetic operators. Also write a program to use the package.
13. Create two threads such that one of the thread generate Fibonacci series and another generate perfect numbers between two given limits.
14. Define an exception called **: Marks Out of bound:** Exception, that is thrown if the entered marks are greater than 100.
15. Program to demonstrate the use of Wrapper class methods.
16. File Processing using Byte stream.
17. File Processing using Character Stream.
18. Write applets to draw the following Shapes:
    (a). Cone **(b).** Cylinder **(c).** Square inside a Circle **(d).** Circle inside a Square
19. Write an applet Program to design a simple calculator.
20. Write an Applet Program to animate a ball across the Screen.

Unit I:

CS10: System Software
(4 Hours – 4 Credits)

Introduction- System Software and Machine Architecture- Simplified Instructional Computer (SIC)- SIC Machine Architecture- SIC/XE Machine Architecture- Traditional (CISC) Machines- VAX Architecture- Pentium Pro Architecture – RISC Machines – UltraSPARC Architecture- PowerPC Architecture- Cray T3E Architecture.

Unit II:
Assemblers- Basic Assembler Functions- A simple SIC Assembler- Assembler Algorithm and Data Structures. Machine-Dependent Assembler features-Instruction formats and addressing modes. Machine-Independent Assembler features-Literals- Expressions-Program blocks. Assembler Design options--One pass Assemblers- Multi-pass Assemblers.

Unit III:
Loaders & Linkers: Basic Loader Functions- Design of Absolute Loader-Simple Bootstrap Loader-Machine Dependent Loader features-Relocation-Program linking-Algorithm and Data structures for a Linking loader. Loader Design options.

Unit IV:
Compilers - Basic compiler Functions – Grammars - Lexical Analysis – Syntactic Analysis- Code Generation-Compiler Design options.

Unit V:
Other System Software: Text Editors- Interactive Debugging Systems.

Text Book
System Software – An Introduction to Systems Programming- Leland L. Beck, 3rd Edition, Pearson Education Asia, 2000.

Unit I	:	Chapter 1
Unit II	:	Chapter 2
Unit III	:	Chapter 3 (3.1, 3.2, 3.4)
Unit IV	:	Chapter 5 (5.1, 5.4)
Unit V	:	Chapter 7 (7.2 & 7.3)

Reference Books
1. D. M. Dhamdhere, Systems Programming and Operating Systems , Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan Systems Programming , Tata McGraw-Hill Edition, 1992.
3. System Software, Santana Chattopadhyay, PHI Learning Private Limited, Delhi, Fifth printing, June 2013.

AS4: Numerical Methods
(4 Hours – 4 Credits)

Unit I:

Algebraic and Transcendental Equations: Errors in numerical computation-Iteration method-Bisection method-Regula-Falsi method-Newton-Raphson method-Horner's method.

Unit II:

Simultaneous Equations: Introduction-Simultaneous equations-Back substitution-Gauss Elimination method-Gauss –Jordan Elimination method-Calculation of Inverse of a matrix- Crout's method-Iterative methods-Gauss-Jacobi Iteration method-Gauss seidal Iteration method-Newton Raphson's method for simultaneous equations.

Unit III:

Interpolation & Introduction: Newton's interpolation Formulae-Central difference Interpolation formulae-Gauss forward, Gauss backward, Lagrange's interpolation formulae- Divided differences-Newton's divided difference formula-Inverse Interpolation.

Unit IV:

Numerical Differentiation and Integration: Introduction-Derivates using Newton's forward difference formula-Derivates using Newton's backward difference formula- Numerical Integration-Newton-cotes quadrature formula-Trapezoidal Rule-Simpson's one third rule-Simpson's 3/8 th rule.

Unit V:

Numerical Solution of Ordinary Differential Equations: Introduction-Taylor series method-Picard's method-Euler's method-Runge-kutta method of second, third, fouth order- Predictor & corrector methods-Mile's method.

Text Book:

Numerical Methods, Second Edition, S.Arumugam, A.Thangapandi Issac, A.Somasundaram, SCITECH publications, 2009.

Unit I	:	Chapter-3
Unit II	:	Chapter-4 (excluding Relation method and its related problems)
Unit III	:	Chapter-7 (Sections: 7.0, 7.1, 7.2((i), (ii) and related problems); 7.3,7.4,7.5,7.6)
Unit IV	:	Chapter-8 (Sections: 8.0,8.1,8.2 related problems, 8.5 (excluding Weddles rule, Booles rule, Romberg's method and related problems))
Unit V	:	Chapter-10 (Sections : 10.0,10.1,10.2,10.3(excluding modified Euler's method & its related problems) 10.4,10.5,10.6)

Reference Books:
1. Mathews J.H. Numerical Method for Maths, Science and Engineering; PHI, New Delhi, 2001.
2. Iqbal H. Khan & Q. Hassan Numerical Methods for Engineers and Scientist - Galgotia Publications (P) Ltd., New Delhi - 1997.
3. M.K. Jain, S.R.K. Iyengar & R.K.Jain - Numerical Methods for Scientific and Engineering Computation - New Age International(P) Ltd., New Delhi - 1996

SBS4: Lab 8: PHP Programming
(2 Hours

- 2 Credits) Write PHP programs for the

following

1) To demonstrate all array operations (array_search(),array_diff(),array_combine(),array_m atch(),sort()
2) To demonstrate all control statements (find factorial of the given number using IF, While, Do-while.)
3) To display inventory table using Key & value pairs
4) To print student table using key & value pairs and search particular student number(whether it is present or not)
5) To illustrate user defined function (define all function type)
   1. Function without input argument and no return value.
   2. Function without input argument and return value.
   3. Function with input argument and no return value.
   4. Function with input argument and return value.
   5. Function with default argument.

6) To find factorial of the given number using recursion
7) To calculate nCr using include command to include the factorial function
8) Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page. To perform string manipulation
9) To process personal details using File
10) To design an student mark database using HTML Form and process using PHP

CS11: Relational Database Management Systems
(5 Hours- 4 Credits)
Unit I:
Overview of database systems: Managing Data – A Historical Perspective – File Systems Versus a DBMS – Advantages of a DBMS – Describing and Storing Data in a DBMS – Queries in a DBMS – Transaction Management – Structure of a DBMS – People Who Work with Databases.

Introduction to database design: Database Design and ER Diagrams – Entities, Attributes, and Entity Sets – Relationships and Relationship Sets – Additional Features of ER Model – Conceptual Design with the ER Model.

Unit II:
The relational model: Introduction to the Relational Model – Integrity Constraints over Relations – Enforcing Integrity Constraints – Querying Relational Data – Logical Database Design: ER to Relational – Introduction to Views – Destroying / Altering Tables and Views.

Relational algebra and calculus: Preliminaries – Relational Algebra: Selection and Projection – Set Operations –Renaming – Joins - Division Relational Calculus: Tuple Relational Calculus – Domain Relational Calculus.

Unit III:
SQL queries, constraints, triggers: The Form of a Basic SQL Query - UNION, INTERSECT, and EXCEPT – Nested Queries – Aggregate Operators – Null Values – Complex Integrity Constraints in SQL – Triggers and Active Databases – Designing Active Databases

Unit IV:
Schema refinement and normal forms: Introduction to Schema Refinement – Functional Dependencies – Reasoning about FD's – Normal Forms – Properties of Decompositions – Normalization – Schema Refinement in Database Design – Other Kinds of Dependencies.

Unit V:
Overview of transaction management: The ACID Properties – Transactions and Schedules
– Concurrent Execution of transactions – Lock Based Concurrency Control – Performance of Locking – Transaction Support in SQL – Introduction to Crash Recovery.
Security and authorization: Introduction to Database Security - Access Control – Discretionary Access Control – Mandatory Access Control – Security for Internet Applications – Additional Issues Related to Security.

Text book:

Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke, McGraw Hill International Edition, Third Edition, 2003.

Unit I	:	Chapters 1.1 – 1.9, 2.1 – 2.5
Unit II	:	Chapters 3.1 – 3.7, 4.1 – 4.3
Unit III	:	Chapters 5.2 – 5.9
Unit IV	:	Chapters 19.1 – 19.8
Unit V	:	Chapters 16.1 – 16.7, 21.1 – 21.6

Reference Books:

1. Database Management Systems - Alexis Leon and Mathews Leon, Vikas Publishing, Chennai, 2002.
2. Database Management Systems - G.K. Gupta, McGraw Hill Education, 4th reprint 2015, Pearson Education Asia, 2001.
3. Database System Concepts – Abraham Silberschatz, Henry F.Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.
4. Database Management Systems – R.Pannerselvam, 2nd Edition, PHI Learning, 2015.
5. Database Systems Models, Languages, Design and application Programming - R.Elmasri and S.B.Navathe, 6th Edition, Pearson Education, 2013.
6. Teach yourself SQL in 21 days - Ryan K.Stephens, Ronald Plew Bryan Morgan and Jeff Perkins, 2nd Edition, SAMS Publishing.

Unit I:

CS12: Operating System
(5 Hours- 4 Credits)

Introduction to Operating Systems: Introduction, What is an Operating systems, Operating system components and goals, Operating systems architecture. Process Concepts: Introduction, Process States, Process Management, Interrupts, Interprocess Communication.

Unit II:
Asynchronous Concurrent Execution: Introduction, Mutual Exclusion, Implementing Mutual Exclusion Primitives, Software solutions to the Mutual Exclusion Problem, Hardware solution to the Mutual Exclusion Problem, Semaphores. Concurrent Programming: Introduction, Monitors.

Unit III:
Deadlock and Indefinite Postponement: Introduction, Examples of Deadlock, Related Problem Indefinite Postponement, Resource concepts, Four Necessary conditions for Deadlock, Deadlock solution, Deadlock Prevention, Deadlock Avoidance with Dijkstra's Banker's algorithm, Deadlock Detection, Deadlock Recovery.
Processor Scheduling: Introduction, Scheduling levels, Preemptive Vs Non-Preemptive Scheduling Priorities, Scheduling objective, Scheduling criteria, Scheduling algorithms.

Unit IV:
Real Memory Organization and Management: Introduction, Memory organization, Memory Management, Memory Hierarchy, Memory Management Strategies, Contiguous Vs Non-Contiguous Memory allocation, Fixed Partition Multiprogrammimg, Variable Partition multiprogramming.
Virtual Memory Management: Introduction, Page Replacement, Page Replacement Strategies, Page Fault Frequency (PFF) Page replacement, Page Release, Page Size.
Unit V:
Disk Performance Optimization: Introduction, Why Disk Scheduling is necessary, Disk Scheduling strategies, Rotational optimization.
File and Database Systems: Introduction, Data Hierarchy, Files, File Systems, File Organization, File Allocation, Free Space Management, File Access control.

Text Book:
Operating Systems, Deitel & Deitel Choffnes, Pearson education, Third edition, 2008.

Unit I : Chapter 1: 1.1, 1.2, 1.12, 1.13 & Chapter 3: 3.1, 3.2, 3.3, 3.4, 3.5
Unit II : Chapter 5: 5.1, 5.2, 5.3, 5.4(up to 5.4.2), 5.5, 5.6 & Chapter 6: 6.1, 6.2
Unit III : Chapter 7: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10
                Chapter 8: 8.1, 8.2, 8 3, 8.4, 8.5, 8.6, 8.7
Unit IV : Chapter 9: 9.1, 9 2, 9.3, 9 4, 9.5, 9.6, 9.8, 9.9
                Chapter 11: 11.1, 11.5, 11.6, 11.8, 11.9, 11.10
Unit V : Chapter 12: 12.1, 12.4, 12.5, 12.6
                Chapter 13: 13.1, 13 2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8

Reference Books:
1. An introduction to Operating systems concepts and Practice, Pramod Chandra P. Bhatt, PHI, Second Edition, 2008.
2. Operating System Concepts, Abraham Silberschatz Peter Galvin Greg Gagne, 6th edition Windows XP Update, Wiley India edition, 2007.
3. Operating Systems Principles and Design, Pal Choudhury, PHI Learning, 2011.
4. Operating Systems, A Concept Based Approach Dhananjay M.Dhamdhere Tata   Mc Graw Hill,

CS13: Software Engineering
(5 Hours- 4 Credits)
Unit I:
Introduction to Software Engineering: Some Definitions – Some Size factors – Quality and Productivity Factors – Managerial Issues. **Planning a Software Project:** Defining the Problem – Developing a Solution Strategy – Planning the Development Process – Planning an Organizational Structure – Other Planning Activities.

Unit II:
Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Staffing-Level Estimation – Estimating Software Maintenance Costs.

Unit III:
Software Requirements Definitions: The Software Requirements Specification – Formal Specification Techniques – Languages and Processors for Requirements Specification.

Unit IV:
Software Design: Fundamental Design Concepts – Modules and Modularization Criteria – Design Notations – Design Techniques – Detailed Design Considerations – Real-Time and Distributed System Design – Test Plans – Milestones, Walkthroughs, and Inspections - Design Guidelines.

Unit V:
Verification and Validation Techniques: Quality Assurance – Static Analysis – Symbolic Execution – Unit Testing and Debugging – System Testing – Formal Verification.
Software Maintenance: Enhancing Maintainability During Development – Managerial Aspects of Software Maintenance – Configuration Management – Source-Code Metrics – Other Maintenance Tools and Techniques.

Text book:

Software Engineering Concepts, Richard Fairley, Tata McGraw Hill Publishing Company Limited, NewDelhi, 1997.

Unit I	:	Chapters: 1.1 – 1.4, 2.1-2.5
Unit II	:	Chapters: 3.1 - 3.4
Unit III	:	Chapters: 4.1 – 4.3
Unit IV	:	Chapters: 5.1 – 5.9
Unit V	:	Chapters: 8.1, 8.3 – 8.7, 9.1 – 9.5

Reference Books:
1. Software Engineering – K.L.James, Prentice Hall of India Pvt. Ltd., New Delhi, 2009.
2. Fundamentals of Software Engineering – Rajib Mall, Prentice Hall of India Pvt. Ltd., New Delhi, 2003.
3. Software Engineering (A Practitioner's Approach) - Roger. S.Pressman. McGraw Hill Publication, International Edition, 5th Edition. 2001.

CS14: Lab 9: Relational Database Management Systems
(6 Hours- 4 Credits)

The following concepts must be introduced to the students:

DDL Commands
> • Create table, alter table, drop table

DML Commands
> • Select, update, delete and insert statements
> • Condition specification using Boolean and comparison operators
> • (and, or, not,=,<>,>,<,>=,<=)
> • Arithmetic operators and aggregate functions (Count, Sum, Avg, Min, Max)
> • Multiple table queries (join on different and same tables)
> • Nested select statements
> • Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
> • Categorization using group by……..having
> • Arranging using order by

1 Create a table Student-master with the following fields client_no,name, address, city, state, pincode, remarks, bal_due with suitable data types.
> a. Create another table supplier_table from client_master. Select all the fields and rename client_no with supplier_no and name with supplier_name.
> b. Insert data into client_master
> c. Insert data into supplier_master from client_master.
> d. Delete the selected row in the client_master.

2. Create a table sales_order with s_order_no and product_no as primary key. Set other fields to store client number, delivery address, delivery date,order status.
> a. Add a new column for storing salesman number using ALTER Command.
> b. Set the s_order_no as foregin key as column constraints.
> c. Set the s_order_no as foreign key as table constraints.
> d. Enforce the integrity rules using CHECK.

3 Create a table student_master with the following fields name, regno, dept and year with suitable data types. Use Select command to do the following.
> a. Select the student's name column.
> b. Eliminate the duplicate entry in table.
> c. Sort the table in alphabetical order.
> d. Select all the Students of a particular department.

4 Create a table sales_order_details with the s_order_no as primary key and with the following fields: product_no, description, qty_ordered, qty_disp,product_rate, profit_percent, sell_price, supplier_name.

a. Select each row and compute sell_price*.50 and sell_price*1.50 for each row selected.
b. Select product_no, profit_percent, Sell_price where profit_per is not between 10 and 20 both inclusive.
c. Select product_no, description, profit_percent, sell_price where profit_percent is not between 20 and 30.

d. Select the suppliername and product_no where suppliername has 'r' or 'h'as second character.

5 Create and use the following database schema to answer the given queries

EMPLOYEE			
DEFAULT			
Field	**Type**	**Null**	**Key**
Eno	Char(3)	No	Primary
Ename	Varchar(50)	No	
Job_type	Varchar(50)	No	
Manager	Char(3)	Yes	Foreign
Hiredate	Date	No	
Dno	Integer	Yes	Foreign
Commission	Decimal(10,2)	Yes	
Salary	Decimal(7,2)	No	

DEPARTMENT			
DEFAULT			
Field	**Type**	**Null**	**Key**
Dno	Integer	No	Primary
Dname	Varchar(50)	Yes	

Perform the following queries:

a. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.

b. Query to display unique Jobs from the Employee Table.

c. Query to display the Employee Name concatenated by a Job separated by a comma.

d. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.

e. Query to display the Employee Name and Salary of all the employees earning more than $2850.

f. Query to display Employee Name and Department Number for the Employee No= 7900.

g. Query to display Employee Name and Salary for all employees whose salary is not in the range of $1500 and $2850.

h. Query to display Employee Name and Department No. of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.

i. Query to display Name and Hire Date of every Employee who was hired in 1981.

j. Query to display Name and Job of all employees who don't have a current Manager.

k. Query to display the Name, Salary and Commission for all the employees who earn commission.

l. Sort the data in descending order of Salary and Commission.

m. Query to display Name of all the employees where the third letter of their name is
_A'.

n. Query to display Name of all employees either have two _R's or have two _A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.

o. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.

p. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.

q. Query to display Name and calculate the number of months between today and the date each employee was hired.

r. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with _J', 'A' and _M'.

s. Query to display Name, Department Name and Department No for all the employees.

t. Query to display Unique Listing of all Jobs that are in Department # 30.

u. Query to display Name, Job, Department No. And Department Name for all the employees working at the Mumbai location.

v. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. and the salary of any employee who earns a commission.

w. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees

x. Query to display the Employee No. And Name for all employees who earn more than the average salary.

y. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a _T'.

6 Create a table master_book to contain the information of magazine code, magazine name and publisher. Weekly/biweekly/monthly, price. Write PL/SQL block to perform insert, update and delete operations on the above table.

7 Create a table to contain phone number, user name, address of the phone user. Write a function to search for a address using phone numbers.

8 Create a table stock to contain the item-code, item-name, current stock, date of last purchase. Write a stored procedure to seek for an item using item-code and delete it, if the date of last purchase is before 1 year from the current date. If not, update the current stock.

9 Create a table to store the salary details of the employees in a company. Declare the Cursor to contain employee number, employee name and net salary. Use Cursor to update the employee salaries.

10 Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table.

ES1.1: Client / Server Computing
(5 Hours – 4 Credits)

Unit I:
Basic concepts of Client/Server – Characteristics – File Servers – Database servers – Transaction servers- Groupware servers – Objective servers – Web servers – Fat servers or fat clients – 2 tier versus 3 tier – Client/Server building blocks – Operating system services. Base services – Extended services – Server scalability – Client Anatomy.

Unit II:

NOS Middleware – Peer-to-peer communications – RPC – MOM Middleware – MOM versus RPC - The fundamentals of SQL and relational databases – Server architecture – Stored procedures, triggers and rules.

Unit III:

Online transaction processing – Decision support systems – OLTP versus DSS: programming effort, database needs – Data warehouses – Elements - Hierarchies – Replication versus Direct access – Replication mechanism – EIS/DSS Tools – Client/server transaction processing – transaction models – TP Monitors – Transaction management standards.

Unit IV:

Groupware – Components – Distributed objects and components – CORBA: components – Object Management Architecture – Services – Business objects.

Unit V:

Client/server Distributed system management – components – Management application – The Internet Management Protocols – OSI Management Framework – The Desktop Management Interface – X/Open Management Standards – Client/server application development tools – Client/Server Application Design.

Text book:

Dan Harkey, Jeri Edwards and Robert Orfali, The Essential Client Server Survival Guide, 2nd Edition,. Galgotia Publications Pvt. Ltd., 2000.

Reference books:

1. Dawna Travis Dewire, Client/Server computing, Tata McGraw Hill.
2. Jafferey D. Schank, Novell's guide to Client/Server Application and Architecture, BPB Publications.
3. Robert Orfali, Dan Harkey and Jeri Edwards, The Essential Client/Server Survival Guide, Galgotia Publications Pvt. Ltd., 2002.

ES1.2: MOBILE APPLICATIONS DEVELOPMENT
(5 Hours – 4 Credits)

Unit I :

Introduction to Android – Creating the First Android Project - Using the TextView Control
- Using the Android Emulator - Limitations of the Android Emulator
Basic Widgets - Understanding the Role of Android Application Components - Understanding Activities - Role of the Android Manifest File - Creating the User Interface - Commonly Used Layouts and Controls- Displaying Messages Through Toast -Creating and Starting an Activity - Using the EditText Control .- Choosing Options with CheckBox Choosing Mutually Exclusive Items Using RadioButtons

Unit II :

Building Blocks for Android Application Design -Laying Out Controls in Containers - Introduction to Layouts - LinearLayout - RelativeLayout - AbsoluteLayout - FrameLayout - TableLayout - Operations Applicable to TableLayout   GridLayout - Specifying Row and Column Position - Adapting to Screen Orientation - Anchoring Controls Defining Layout **Utilizing Resources and Media-Resources -** Creating Values Resources- Using Drawable Resources – Switching States with Toggle Buttons

Unit III :

Creating an Image Switcher Application - Scrolling Through ScrollView - playing audio – playing video - **Using Selection Widgets** - Using ListView - Using the Spinner Control - Using the GridView Control - Creating an Image Gallery Using the ViewPager Control

Unit IV :

Displaying and Fetching Information Using Dialogs and Fragments – What are dialogs - Selecting the Date and Time in One Application – Fragments - Creating Fragments with Java Code -Creating Special Fragments

Unit V :

Creating Interactive Menus and ActionBars - Menus and Their Types - Creating Menus Through XML - Creating Menus Through Coding - Applying a Context Menu to a ListView
- Using the ActionBar - Replacing a Menu with the ActionBar - Creating a Tabbed ActionBar - Creating a Drop-Down List ActionBar - **Using Databases** - Using the SQLiteOpenHelper Class - Accessing Databases with the ADB - Creating a Data Entry Form

Text Book : Android Programming Unleashed, B.M. Harwani, Pearson Education, Inc., I edition 2013

Unit I	:	Chapters 1 and 2
Unit II	:	Chapters 3 and 4
Unit III	:	Chapters 4 and 5
Unit IV	:	Chapter 6
Unit V	:	Chapter 7 and 8

Reference Books :
1. Android Apps for Absolute Beginners – II Edition –Wallace Jackson – Apress - 2013
2. Android Application Development All-in-One For Dummies - Barry A. Burd – 2011
   –Wiley
3. The Android book – Imagine Publishing Ltd - 2011

ES1.3: Theory of Computation
(5 Hours – 4 Credits)

Unit I:
    Finite Automata : Introduction – Finite State Machine – Acceptance of Strings and
Languages – Deterministic Finite Automata – Non Deterministic Finite Automata – Significance of Non Deterministic Finite Automaton – NFA with ε-Transitions – Conversions and Equivalence – NFA to DFA Conversion – Minimization of FSM – Equivalence between Two FSM's – FA with Output – Equivalence of Moore and Mealy Machines.

Unit II:
    Regular Expressions : Introduction – Regular Set – Regular Expressions – Finite Automata and Regular Expressions – Conversion of Finite Automata to Regular Expressions
– Identity Rules – Proving Languages not to be Regular – Applications of Regular Expression
– Closure Properties of Regular Languages.

Unit III :
    Context Free Grammar : Introduction – Regular Grammar – Equivalence between Regular Grammar and FA – Context Free Grammar – Derivation and languages – Derivation Trees – Relationship between Derivation and Derivation Tree – Ambiguity – Simplification of CFG.

Unit IV:
    Properties of Context Free Languages: Introduction – Normal Forms – Applications of Context free Grammar – Properties of Context Free Languages.

Unit V:
    Turing Machines : Introduction – Model of Turing machine – Definition of Turing
machine – Programming Techniques for Turing Machines – Computable Language and Functions – Two way infinite Tape – Power of Turing Machine – Comparison of FM, PDA and TM.

Text Book:
Theory of Computation – A.A.Puntambekar, Technical Publications, Pune, First Edition 2009

Unit I	:	Chapters 2
Unit II	:	Chapters 3
Unit III	:	Chapters 4
Unit IV	:	Chapters 5
Unit V	:	Chapter 7.1 to 7.8

Reference Books:
1. Introduction to Automata Theory, Languages and Computation – John E.Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, Third Edition, Pearson, 2014.
2. Theory of Computer Science - Automata, Languages and Computation , Mishra K L P and Chandrasekaran N, Third Edition, Prentice Hall of India, 2004.
3. Elements of the Theory of Computation Harry R Lewis and Christos H Papadimitriou, Second Edition, Prentice Hall of India, Pearson Education, New Delhi

SBS 5: Lab 10: Python Programming
(2 Hours - 2 Credits)
List of Exercises for Python Programming:
Section: A (Simple programs)
1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:

Grade A: Percentage >=80
Grade   B:
Percentage>=70   and
<80   Grade   C:
Percentage>=60   and
<70   Grade   D:
Percentage>=40   and
<60   Grade   E:
Percentage<40

3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first 'n' terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - - - - - n/n!$
7. WAP to calculate the sum and product of two compatible matrices.

Section: B (Visual Python)

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects
   - i. *curve*
   - ii. *sphere*
   - iii. *cone*
   - iv. *arrow*
   - v. *ring*
   - vi. *cylinder*

2. WAP to read n integers and display them as a histogram.

3. WAP to display sine, cosine, polynomial and exponential curves.

4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.

5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula $m=60/(t+2)$, where t is the time in hours. Sketch a graph for t vs. m, where $t>=0$.

6. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
   - i. *velocity wrt time (v=u+at)*
   - ii. *distance wrt time (s=u*t+0.5*a*t*t)*
   - iii. *distance wrt velocity (s=(v*v-u*u)/2*a)*

Reference Books
1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. John V. Guttag, Introduction to computation and programming using Python, Revised and Expanded edition, PHI, 2015
2. Python Tutorial/Documentation www.python.or 2015
3. Allen Downey, Jeffrey Elkner, Chris Meyers, How to think like a computer scientist: learning with Python , Freely available online.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

CS15: Data Communication and Computer Networks
(5 Hours – 4 Credits)

Unit I:
Introduction: A Brief History – Applications – Computer Networks – Categories of Networks – Standards and Standards Organizations – Network Architecture – Open Systems and OSI Model – TCP/IP Architecture. **Communication Media and Data Transmission:** Fourier Analysis – Analog and Digital Data Transmission – Modulation and Demodulation – Transmission Media – Wireless Communications – Data Transmission Basics – Transmission Mode – Interfacing – Multiplexing. **Error Detection and Correction:** Types of Errors – Error Detection – Error Correction.
Data Link Control and Protocol Concepts: Flow Control – Error Control – Asynchronous Protocols – Synchronous Protocols – High-Level Data Link Control (HDLC).

Unit II:
Local Area Networks: Types of Networks and Topology –LAN Transmission Equipment – LAN Installation and Performance.
Ethernet: IEEE Standard 802.3 **Token Bus**: IEEE Standard 802.4 **Token Ring:** IEEE Standard 802.5 – Fiber Distributed Data Interface (FDDI) – **Distributed Queue Dual Bus (DQDB):** IEEE Standard 802.6 – LAN Operating Systems and Protocols – Ethernet Technologies.
Wide Area Networks: WAN Transmission Methods – WAN Carrier Types – WAN Transmission Equipments – WAN Design and Multicast Considerations – WAN Protocols.

Unit III:
Integrated Services and Routing Protocols: Integrating Services – ISDN Services – ISDN Topology – ISDN Protocols – Broadband ISDN – Asynchronous Transfer Mode (ATM) – Principal Characteristics of ATM – Frame Relay – Comparison of ISDN, ATM and Frame Relay.
Wireless LANS: WLAN Applications – Wireless LAN Requirements – Planning for Wireless LANs – Wireless LAN Architecture – IEEE 802.11 Protocol Layer – IEEE 802.11 Physical Layer – Designing the Wireless LAN Layout – WAP Services.

Unit IV:
Internet Working: Principles of Internet Working – Routing Principles – Internetwork Protocols (IP) – Shortcomings of IPv4 – IP Next Generation.
TCP Reliable Transport Service: Transport Protocols – The Service TCP Provides to Applications – End –to-End Service and Datagrams – Transmission Control Protocol – User Datagram Protocol.
Unit V:
Network Applications: Client-Server Model – Domain Name System (DNS) – Telnet – File Transfer and Remote File access – Electronic Mail – World Wide

Web (WWW)

Network Management: Goal of Network Management – Network Management Standards – Network Management Model – Infrastructure for Network Management – Simple Network Management Protocol (SNMP).

Text Book:
  Data Communications and Computer Networks, Brijendra Singh ,Second Edition, PHI, 2006.
Unit I	:	Chapters 1,2,3,5
Unit II	:	Chapters 6, 7
Unit III	:	Chapters 8, 9
Unit IV	:	Chapters 10,11
Unit V	:	Chapter 12

Reference Books:
  1. Computer Networks, Andrew S Tanenbaum, 4th Ed, Prentice Hall of India, 2006.
  2. Data Communications and Computer Networks , Prakash C. Gupta, Prentice Hall of India, 2005.
  3. Data and Computer Communications, William Stallings, PHI, 2007.
  4. Data Communication and Networking ,Behrouz A. Forouzan, TMH, 2005.
  5. Data Communications and Networks , Achyut S Godbole, TMH,2005.

CS16: Lab 11: Web Technology
(6 Hours – 4 Credits)
(Select one question from JavaScript and ASP.net)

JavaScript & JSP

1. Write a JavaScript Program To Generate Fibonacci Series
2. Write a JavaScript Program For Checking Palindrome Or Not
3. Write a JavaScript Program To Validate Form
4. Write a JavaScript Program To Create Popup Window
5. An Html Form With A JavaScript Event Handler
6. Write a JavaScript Program To Remove Items From A Dropdown List
7. Write a JavaScript Program To Display A Random Image
8. Write a JavaScript Program To Valid An Email Address.
9. Write a JSP to add the contents of another JSP file using **@include** directive.
10. Write a JSP to check whether the given number is prime or not.
11. Write a JSP to forward one JSP file to another JSP file using **forward** action.

ASP.Net
12. Working with Page and Forms Using Asp .Net.
13. To Create An Account Registration Form And Perform The Following Validation
     a) User Name

b) Password
　　　　c) Retype Password
　　　　d) Gender
　　　　e) Email-Id
　　　　f) Date Of Birth
　　　　g) Mobile
14. To Read Student Details From Xml File
15. To Display Vehicle Details In Tree View Control From Xml File
16. Create Any Application Program Using Menu Server Control
17. To Process Student Database Using **Sqldatasourc**e Control
18. To Display Employee Details From The Database Using **Sitemapdatasource**
19. To Read And Display Personal Database Using **Xmldatasource** Control
20. Create A Web Page For Your Department
21. Send An Mail

Unit I:

CS17: Data Mining
(5 Hours - 4 Credits)

Introduction: Data mining application – data mining techniques – data mining case studies the future of data mining – data mining software. **Association rules mining:** Introduction -Basics-task and a Naive algorithm- Apriori algorithm – improve the efficiency of the Apriori algorithm – mining frequent pattern without candidate generation (FP-growth)
– performance evaluation of algorithms.

Unit II:
　　　　Data warehousing: Introduction – Operational data sources- data warehousing – Data Warehousing design – Guidelines for data warehousing implementation - Data warehousing -Metadata. **Online analytical processing (OLAP):** Introduction – OLAP characteristics of OLAP system – Multidimensional view and data cube - Data cube implementation – Data Cube operations OLAP implementation guidelines.

Unit III:
　　　　Classification: Introduction – decision tree – over fitting and pruning - DT rules – Naïve Bayes method- estimation predictive accuracy of classification methods - other evaluation criteria for classification method – classification software.

Unit IV:
　　　　Cluster analysis: cluster analysis – types of data – computing distances-types of cluster analysis methods - partitioned methods – hierarchical methods – density based methods – Dealing with large databases – quality and validity of

cluster analysis methods – cluster analysis software.

Unit V:

Web data mining: Introduction- web terminology and characteristics-locality and hierarchyin the web- web content mining-web usage mining- web structure mining – web mining software. **Search engines:** Search engines functionality- search engines architecture – Ranking of web pages.

Text Books

Introduction to Data mining with case studies, G.K. Gupta, PHI Private limited, New Delhi, 2008.

Unit I   :   Chapters 1 & 2
Unit II :   Chapters 7 & 8
Unit III :   Chapter 3
Unit IV: Chapter 4
Unit V :   Chapters 5 & 6

Reference Books

1. Data Warehousing, Data Mining & OLAP, Alex Berson and Stephen J. Smith, Tata Mc Graw Hill Edition, Tenth Reprint 2007
2. Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Second Edition, Elsevier, 2007
3. Insights into Data Mining K.P. Soman, Shyam Diwakar, V. Ajay, Theory and Practice, PHI Publications Eastern Economy Edition 6th Printing, 2012

Unit I:

ES2. 1: Computer Graphics

(5 Hours – 4 Credits)

A survey of computer graphics: Computer-Aided Design   - Presentation Graphics – Computer Art – Entertainment – Education and Training – Visualization – Image Processing – Graphical User Interfaces.

Overview of Graphics Systems: Video Display Devices – Raster Scan Systems – Random Scan Systems – Input Devices – Hard Copy Devices.

Unit II:
Output Primitives: Points and Lines – Line Drawing Algorithms – Circle Generating Algorithms – Ellipse Generating Algorithms – Filled Area primitives.

Unit III:
Attributes of Output Primitives: Line Attributes – Curve Attributes – Color and Gray Scale Levels – Area Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Antialiasing.

Unit IV:
Two–Dimensional Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations – Transformations between Coordinate Systems.

Unit V:
Two –Dimensional Viewing : The Viewing Pipeline – Viewing Coordinate Reference Frame
– Window –to- Viewport Coordinate Transformation – Two-Dimensional Viewing Functions
– Clipping Operations – Point Clipping – Line Clipping – Polygon Clipping – Curve Clipping
– Text Clipping – Exterior Clipping.

Text Book:
Computer Graphics, Donald Hearn and M. Pauline Baker, Prentice Hall Of India Pvt. Ltd., New Delhi, Second Edition, 1994.

Unit I	:	Chapters 1.1 – 1.8, 2. 1-2.3, 2.5, 2.6
Unit II	:	Chapters 3.1, 3.2, 3.5-3.7, 3.11
Unit III	:	Chapters 4.1 – 4.8
Unit IV	:	Chapters 5.1 – 5.5
Unit V	:	Chapters 6.1 – 6.11

Reference Books:
1. Computer Graphics, Multimedia and Animation – Malay K. Pakhira, Prentice Hall Of India Pvt. Ltd. , New Delhi – 2008
2. Fundamentals Of Computer Graphics And Multimedia – D. P. Mukherjee, Prentice Hall Of India Pvt. Ltd. , New Delhi – 1999
3. Multimedia Graphics, John Villamil, Casanova ,LeonyFernanadez, Eliar, PHI,1998.

ES2. 2: Compiler Design
(5 Hours – 4 Credits)

Unit I :
Introduction to Compliers: Compliers and Translator – Need of Translator – The structure of a Complier – Lexical analysis – Syntax analysis – Intermediate code generation – optimization – code generation – Complier – writing tools. Finite automata and lexical Analysis: The role of the lexical analysis – A simple approach to the design of lexical analyzers- Regular expressions to finite automata – Minimizing the number of states of a DFA.

Unit II :

      The Syntactic specification of programming languages: context free grammars – derivations and parse trees – capabilities of context free grammars. Basic parsing techniques: Parsers – shift – reduce parsing – operator – precedence parsing – top down parsing – predictive parsers.

Unit III:

      Syntax – directed translation: syntax – directed translation schemes – implementation of syntax – directed translators – intermediate code – postfix notation – parse trees and syntax trees – 3 address code – quadruples and triples – translation of assignment statements – Boolean expressions – statements that alter the flow of control. Symbol tables: the contents of a symbol table – data structures for symbol table – representing scope information.

Unit IV:

      Run time storage administration: Implementation of a simple stack allocation scheme
– implementation of block-structured languages – storage allocation in block structured languages. Error deduction and recovery: errors – lexical phase errors – syntactic phase errors
– semantic errors.

Unit V:

      Introduction of code optimization: The principle sources of optimization – loop optimization – the DAG representation of basic blocks – value numbers and algebraic laws – Global data flow analysis. Code generation: Object programs – problems in code generation – a machine model – a simple code generator – register allocation and assignment – code generation from DAG's – peepholes optimization.

Text Book

      Principles of Complier Design,Alfred V.Aho, Jeffrey D.Ullman , Narosa Publishing House.25th Reprint, 2001.

Unit I	:	Chapters 1.1 – 1.11, 3.1 – 3.6 Unit II :
		Chapters 4 & 5
Unit III	:	Chapters 7.1 – 7.9 , & 9
Unit IV	:	Chapters 10(excluding 10.3) & 11 Unit V :
		Chapters 12 & 15

Reference Books

1. Compiler Principles, Techniques and Tools by Alfred V.Aho, Monica S.Lam, Ravi Sethi, Jeffrey D. Ullman, Second edition, Pearson Publications, 2007.
2. Advanced Compiler Design and Implementation - Steven S. Muchnick, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Introduction to Compiler Techniques, J.P. Bennet, Second Edition, Tata

McGraw-Hill, 2003.

ES2. 3: Information Security
(5 Hours – 4 Credits)

Unit I:

Introduction: History of Information security - What is Security? - CNSS Security Model - Components of an Information System - Balancing Information security and Access – Approaches to Information security implementation - The SDLC - The Security SDLC.

Unit II:

Security Investigation: Need for Security, Business Needs, Threats, Attacks, Professional, Legal and Ethical Issues in Information security.

Unit III:

Managing IT Risk: An overview of Risk Management - Risk Identification – Risk Assessment - Risk Control Strategies- Selecting Risk Control Strategy – Quantitative Versus Qualitative Risk Control Practices.ling Risk.

Unit IV:

How to plan for security: Information security Planning and Governnance - Information Security Policy, Standards and Practices - ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture – Continuity strategies.

Unit V :

Security Technology: Introduction – Intrusion detection and prevention systems - Scanning and Analysis Tools – Biometric access controls – Cipher methods – Cryptographic algorithms – Cryptographic tools – Protocols for secure communication- Attacks on Cryptosystems.

Text book:

Principles of Information Security, Michael E Whitman and Herbert J Mattord, Fourth Edition, CENGAGE Learning, 6th Indian Reprint, 2013.

Unit I	:	Chapter 1
Unit II	:	Chapters 2 and 3
Unit III	:	Chapter 4
Unit IV	:	Chapter 5
Unit V	:	Chapters 7 and 8

Reference books:

1. Handbook of Information Security Management, Micki Krause, Harold F. Tipton, Vol. 1-3, CRC Press LLC, 2004.
2. Hacking Exposed, Stuart Mc Clure, Joel Scrambray, George Kurtz, TMH, 2003
3. Computer Security Art and Science, Matt Bishop, Pearson/PHI, 2002.

SBS 6: Quantitative Aptitude
(2 Hours - 2 Credits)

Unit I:
Numbers - HCF & LCM of numbers – Decimal Fractions

Unit II:
Square roots and Cube roots- Average – Problems on ages.

Unit III:
Percentage – Profit and Loss – Ratio and Proportion.
Unit IV:
Time and Work – Time and Distance.

Unit V:
Simple Interest – Compound Interest.

Text Book:
Quantitative Aptitude, R.S. Aggarwal, S. Chand & Company Ltd, New Delhi,Reprint 2011.

Unit I   :   Page nos. 3-29, 30-45, 46-66
Unit II   :   Page nos. 117-138, 139-160, 182-194
Unit III :   Page nos. 208-250, 251-293, 294-310
Unit IV   :   Page nos. 341-370, 384-404
Unit V   :   Page nos. 445-465, 466-486

Reference Books:

1.   Quantitative Aptitude and reasoning, R.V. Praveen, PHI Learning, 2nd Edition 2013. 2.Magical book on Quicker Maths, M.Tyra, BSC Publishing Co. Pvt.Ltd, Delhi. Reprint, 2011.
2.   Quantitative Aptitude for Competitive Exams, Abhijit Guha, 4th Edition, Tata Mc Graw Hill Company, New Delhi.