APPENDIX – 32 (R&S)

UNIVERSITY OF MADRAS

SRI SANKARA ARTS AND SCIENCE COLLEGE

(AUTONOMOUS)

B.Sc., COMPUTER SCIENCE

(Effective from the academic year 2018-2019)

REGULATIONS

Choice based credit system.

1. ELIGIBILITY FOR ADMISSION:

Candidates for admission to the first year of the Degree of Bachelor of Science courses shall be required to have passed the Higher Secondary Examinations with a computer science / Mathematics / Statistics / Business Mathematics (Academic Stream) conducted by the Government of Tamil Nadu or CBSE pattern shall be permitted to appear and qualify for the B.Sc Degree Examination of the University of Madras affiliated colleges of this University.

2. STRUCTURE OF THE COURSE

The course is organized on semester basis with a total of six semesters. Each student will opt for a comprehensive, interactive course with one of the faculty member. The topic

of specialization and course content will be determined by the dept/course advisor.

Core practical **Laboratory:** Independent system shall be provided for the each student. It is recommended that the practical training be organized as an exercise rather than simple demonstration. The student must actually perform the experiments.

3. ELIGIBILITY FOR THE AWARD OF DEGREE

A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study in a Autonomous College for a period of not less than three academic years, passed the examinations of all the Six Semesters prescribed earning **140** credits in Parts-I, II, III, IV, V & VI and fulfilled such conditions as have been prescribed therefore.

The parent university will award degrees to the students evaluated and recommended by autonomous colleges. The degree certificates will be in a common format devised by the university. The name of the college will be mentioned in the degree certificate, if so desired. The declaration of results was decided by the examination committee.

4. DURATION:

Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semesters, the second academic year the third and fourth semesters and the third academic year the fifth and sixth semesters respectively.

The odd semesters shall consist of the period from June to November of each year and the even semesters from December to April of each year. There shall be not less than 90 working days for each semester exclusive of the days for the conduct of semester examinations.

In each semester, Papers are administered in 15 teaching weeks and another 5 weeks are utilized for evaluation and grading purposes. Each week has 30 working hours spread over in a 5 day week. Depending upon the content and specialization, a paper may have 1 to 6 credits. Total number of teaching hours in a semester will be 450 hrs. One credit of each theory paper is equal to 15 hrs of lectures or 30 hrs of practical works.

5. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAMMES

The candidates shall complete the B.Sc Degree Programmes within 6 years from the date of admission. The term completing the programmes means passing all the prescribed examinations of the programme to become eligible for the degree. No candidate shall be permitted to appear for the examinations after the prescribed period for completing the programme.

6. COURSE OF STUDY

A Bachelor's programme consists of a number of papers. The term Course is used to indicate logical part of a subject matter of the programme. In each of Bacherlor's programmes, there will be a prescription of (i) language –I (Tamil, Sanskrit or

other languages), (ii) language – II (English), (iii) a set of compulsory courses (called core subjects), some optional courses (called elective / allied subjects) and projects, (iv) a set of papers recommended by UGC and TANSCHE (Advanced Tamil / Soft skill / Environmental Studies / Value education), and (v) Extension activities.

The detail of the Study for Bachelor Degree Courses shall consist of the following:

PART – I Language Courses (LC) [Tamil / Other Languages]

PART – II English Language Courses (ELC)

PART – III Core Subjects

Allied Subjects

Projects / Field work

PART – IV

1. (a) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under

Part-I shall take Tamil comprising of two papers (level will be at 6th Standard).

(b) Those who have studies Tamil up to XII Std. and taken a Non-Tamil Language under Part-

I shall take Advanced Tamil comprising of two papers.

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

papers.

2. Skill Based Subjects - Soft Skills

A candidate shall be eligible for the award of the degree only if he/she has undergone the prescribed papers on Soft Skills. For three years UG degree Programme, a candidate must undergo a minimum of 4 papers (4 x 2 = 8 credits). Papers will be finalized in due course.

3. Environmental Studies

A candidate shall be eligible for the award of the degree only if he/she has undergone the prescribed paper on Environmental studies. For three years UG degree Programme, a candidate must undergo environmental studies during third semester of second year (2 credits). Syllabus is common to all UG courses.

4. Value Education

A candidate shall be eligible for the award of the degree only if he/she has undergone the prescribed paper on value education. For three years UG degree Programme, a

candidate must undergo value education during fourth semester of second year (1 credit). Paper will be finalized in due course.

PART – V Extension Activities

A candidate shall be awarded a maximum of 1 Credits for Compulsory Extension Service. All the Students shall have to enroll for NSS /NCC/ NSO (Sports & Games) Rotract / Youth Red cross or any other service organizations in the college and shall have to put in Compulsory minimum attendance of 40 hours which shall be duly certified by the Principal of the college before 31st March in a year. If a student LACKS 40 HOURS ATTENDANCE in the First year,

he/she shall have to compensate the same during the subsequent years. Students those who complete minimum attendance of 40 hours in One year will get HALF A CREDIT and those who complete the attendance of 80 or more hours in Two Years will ONE CREDIT. Literacy and population Education Field Work shall be compulsory components in the above extension service activities. The working hours should not overlaps the normal teaching hours.

Student advisor

All teachers of the department shall function as student advisors. There will be more or less an equal number of students assigned to each student advisor of a department. The student advisor will help the students in choosing core

and elective papers of study. The student advisor shall be responsible for registration of papers (subjects) by his students. The student advisor will offer all possible student support services

7. CREDITS

The term credit is used to describe the quantum of syllabus for various programmes in terms of periods of study. It indicates differential weightage given according to the contents duration of the courses in the curriculum design. The minimum credit requirement for a three year Bacherlor's programme shall be **140** credits. Each subject (course) is designed variously under lectures / tutorials / laboratory work / seminar / project work etc., to meet effective teaching and learning needs and credits are assigned suitably.

One credit for each lecture / tutorial / project work period per week shall be alloted. One credit for two laboratory hours per week shall be alloted. In practical, each credit should cover minimum of six experiments. Thus normally, in each of the subject, credits will be assigned on the basis of the lectures / tutorials / laboratory work / project work and other forms of learning in a 15 week schedule.

8. SCHEME OF EXAMINATION

There shall be continuous, comprehensive evaluation of students through internal and external examination. At least 2 internal examinations (Sessional Tests) per semester and 1 semester ending examination should be conducted.

Sessional Test I will he held during sixth week for syllabi covered till then. Sessional Test I will be a combination of a variety of tools such as class test, assignment, papr presentation etc., that would be suitable for the paper. This required an element of openness. The students are to be informed in advance about the nature of assessment and the procedures.

However the tests are compulsory. Test I may be for one hour duration. The pattern of question paper will be decided by the respective board of studies.

Sessional Test I will carry 20% of marks of the entire paper.

Sessional Test II will he held during eleventh week for syllabi covered between seventh and eleventh weeks. Sessional Test I will be a combination of a variety of tools such as class test, assignment, paper presentation etc. that would be suitable for the paper. It will also have an element of openness. The students are to be informed in advance about the nature of assessment and the procedures. However the tests are compulsory. Test II may be for one hour duration. The pattern of question paper will be decided by the respective board of studies.

Sessional Test II will carry 20% of marks of the entire paper.

There will be one End Semester examination of 2 - 3 hours duration in each paper. The End semester examination will cover all the syllabi of the paper for 60% of Marks.

A dissertation may be offered in lieu of one / two papers / practicals. It shall be evaluated by two examiners one external and one internal appointed by the Controller of Examination. Wherever there is viva-voce, it shall be conducted by the common Viva Board consisting of the Chairman and internal members of the Board of Examination in the concerned subject, internal guide and one external expert as approved by the Controller of Examinations.

End semester practical examinations shall be held before the theory examinations to benefit the students to undertake examinations of other departments.

Every course offered will have three components associated with the teaching-learning process of the course, namely (i) Lecture - L (ii) Tutorial - T (iii) Practicals - P, (iv) Self study - S where

L stands Lecture session. **T** stands Tutorial session consisting participatory discussion / self study / desk work / brief seminar presentations by students and such other novel methods that make a student to absorb and assimilate more effectively the contents delivered in the Lecture classes.

P stands Practice session and it consists of Hands on experience / Laboratory Experiments / Field Studies / Case studies that equip students to acquire the much required skill component.

S stands Self study session consisting participatory discussion by student with the guidance of faculty. This session is not included in the weekly hour plan.

In terms of credits, every one hour session of L amounts to 1 credit per semester, a minimum of two hour session of T or P amounts to 1 credit per semester and no credits alloted to self study hour, over a period of one semester of 15 weeks for teaching-learning process. The total duration of a semester is 20 weeks inclusive of semester-end examination.

A course shall have either or all the three components. That means a course may have only lecture component, or only practical component or combination of any two or all the three components. The total credits earned by a student at the end of the semester upon successfully completing the course are L + T + P + S. The credit pattern of the course is indicated as L: T: P: S. For example: a theory course with a L-T-P-S schedule of 4-0-0-2 will be assigned 4 credits, and a lab practical course with a L-T-P-S schedule of 0-0-3-0 will be assigned 3 credits.

For B.Sc. courses Part I, Part II and Part IV subjects will be provided to first to fourth semesters. In fifth and sixth semesters only part III papers provided. Total of 30 hrs was to be maintained constantly for all semesters.

Total credits of 140 attained through three years of their study period.

9. Question Paper Pattern

SECTION – A (30 words)

10 OUT OF 12 - 10 X 2 marks = 20 marks

SECTION – B (200 words)

5 out of 7 -5 x 5 marks = 25 marks

SECTION – C (500 words)

3 out of 5 - 3x 10 marks = 30 marks

TOTAL = 75 marks

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10. SCHEME OF EXAMINATIONS:

SUBJECTS	CREDITS	EXAM HRS	MAX. MARKS		
			Internal	External	TOTAL
PART I Language	3	3	25	75	100
PART II English	3	3	25	75	100
PART III Core Subject	4	3	25	75	100
Core Practical	3	3	40	60	100
Allied Paper	5	3	25	75	100

Allied Practical	3	3	40	60	100
PART IV 1. (a) Those who have not studied Tamil up to XII Std. and taken a Non-Tamil Language under Part-I shall take Tamil comprising of two paper (level will be at 6th Standard). (b) Those who have studies Tamil up to XII Std. and taken a Non- Tamil Language under Part-I shall take Advanced Tamil comprising of two papers. (c) Others who do not come under a + b can choose non-major elective comprising of two papers.	2	2	25	75	100

2. Skill based subjects – Soft Skill	3	2	50	50	100
PART V – Extension activities	1				
Total credits : 27					

The following procedure be followed for internal Marks

The number of working hours per week for the students for getting the **140** prescribed credits should not exceed 30 hours of class per week and no faculty member should be allocated extra hours beyond the prescribed 16 lecture hours.

The following procedure be followed for Internal Marks

Theory Papers: **Internal Marks 25**

INTERNAL MARKS

Tests (2 out of 3)	= 10
Attendance	= 5
Seminars	= 5
Assignments	= 5
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	25 marks

Break-up Details for Attendance

Below 60%	- No marks
60% to 75%	- 3 marks
76% to 90 %	- 4 marks
91% to 100%	- 5 marks

Practical:	**Internal Marks**	**40**
	Attendance	5 marks
	Practical Test best 2 out of 3	30 marks
	Record	5 marks

11. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

i. Candidates shall register their names for the First Semester Examination after the admission in UG Courses.

ii. Candidates shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination subject to the condition that the candidates should register for all the arrear subject of earlier semesters along the current (subsequent) Semester Subjects.

iii. Candidates shall be eligible to go to subsequent semester, only if they earn sufficient attendance as prescribed therefore by the Academic Council from time to time. Provided in case of a candidate earning less than 50% of attendance in any one of the Semesters due to any extraordinary circumstances such as medical grounds, such candidates who shall produce Medical Certificate issued by the Authorised Medical Attendant (AMA), duly certified by the Principal of the college, shall be permitted to proceed to the next semester and to complete the Course of study. Such Candidates shall have to repeat the missed Semester by rejoining after completion of Final Semester of the course, after paying the fee for the break of study as prescribed by the Academic Council from time to time.

iv. There shall be examinations at the end of each semester, for odd semesters in the month of October / November, for even semesters in April / May. A candidate who does not pass the examination in any paper(s) shall be permitted to appear in such failed courses in the subsequent examinations to be held in October / November or April / May.

v. The results of all the examinations will be published through the college Website.

12. PASSING MINIMUM

A candidate shall be declared to have passed:

a) There shall be no Passing Minimum for Internal.

b) For External Examination, Passing Minimum shall be of 40 % (Forty Percentage) of the maximum marks prescribed for the paper for each Paper/Practical/Project and Viva-voce.

c) In the aggregate (External + Internal) the passing minimum shall be of 40%. d) He/She shall be declared to have passed the whole examination, if he/she passes in all the papers and practicals wherever prescribed / as per the scheme of examinations by earning **140** CREDITS in Parts-I, II, III, IV & V. He/she shall also fulfill the extension activities prescribed earning a minimum of 1 Credit to qualify for the Degree. He/She shall also complete two certificate courses to qualify for the Degree.

13. CLASSIFICATION OF SUCCESSFUL CANDIDATES

PART- I TAMIL / OTHER LANGUAGES

TAMIL/OTHER LANGUAGES: Successful candidates passing the Examinations for the Language and securing the marks (1) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND class, respectively. All other successful candidates shall be declared to have passed the examination in the THIRD Class.

PART – II ENGLISH

ENGLISH: Successful candidates passing the examinations for English and securing the marks (i) 60 percent and above and (ii) 50 percent and above but below 60 percent in the aggregate shall be declared to have passed the examination in the FIRST and SECOND Class, respectively. All other successful candidates shall be declared to have passed the examination in the THIRD class.

PART – III consisting of CORE SUBJECTS, ALLIED SUBJECTS, PROJECT with three papers: Successful candidates passing the examinations for Core papers together and securing the marks (i) 60 percent and above (ii) 50 percent and above but below 60 percent in the aggregate of the marks prescribed for the Core papers together shall be declared to have passed the examination in the FIRST and SECOND Class respectively. All other successful candidates shall be declared to have passed the examinations in the THIRD Class.

PART – IV consisting of sub items 1 (a), (b) & (c), 2, 3 and 4

Successful Candidate earning of 2 credits for each paper SHALL NOT BE taken into consideration for Classification / Ranking / Distinction.

PART – V EXTENTION ACTIVITIES

Successful Candidate earning of 1 credit for extension activities SHALL NOT BE taken into consideration for Classification / Ranking / Distinction.

14. RANKING

Candidates who pass all the examinations prescribed for the Course in the FIRST APPEARANCE ITSELF ALONE are eligible for Ranking / Distinction.

Provided in the case of Candidates who pass all the examinations prescribed for the Course with a break in the First Appearance due to the reasons as furnished in the Regulations 8(iii) category are only eligible for Classification.

15 (a) GRADING SYSTEM:

1. Passing Minimum is 40% of the ESE and also 40% of the maximum of that paper/course.
2. Minimum Credits to be earned:

For THREE year Programme: Best 140 Credits (Part I and II : Languages, Part III Major, Elective, Part –IV Soft skills and Part V :Extension activities)

3. Marks and Grades:

The following table gives the marks, grade points, letter grades and classification to indicate the performance of the candidate.

Conversion of Marks to Grade Points and Letter Grade (Performance in a Course / Paper)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90–100	9.0–10.0	O	Outstanding
80–89	8.0–8.9	D+	Excellent
75–79	7.5–7.9	D	Distinction
70–74	7.0–7.4	A+	Very Good
60–69	6.0–6.9	A	Good
50–59	5.0–5.9	B	Average

40–49	4.0–4.9	C	Satisfactory
00–39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

Ci = Credits earned for course i in any semester.

Gi = Grade Point obtained for course i in any semester.

n refers to the semester in which such courses were credited.

For a Semester :

GRADE POINT AVERAGE [GPA] = $\sum i$ CiGi / $\sum i$ Ci

Sum of the multiplication of grade points by the credits of the courses

GPA = ----------

Sum of the credits of the courses in a semester

For the entire programme:

CUMULATIVE GRADE POINT AVERAGE [CGPA] = $\sum n \sum i$CniGni /$\sum n \sum i$Cni

Sum of the multiplication of grade points by the credits of the entire programme

CGPA= ----------

Sum of the credits of the courses of the entire programme

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5-10.0	O+	First Class - Exemplary *
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction *
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	

4.5 and above but below 5.0	C+	Third Class
4.0 and above but below 4.5	C	
0.0 and above but below 4.0	U	Re-appear

* The candidates who have passed in the first appearance and within the prescribed

semester of the UG Programme (Major, Allied and Elective courses alone) are eligible.

16. TRANSITORY PROVISION

Candidates who have undergone the course of study prior to the academic year 2018-2019 will be permitted to appear for the examinations under those Regulations for a period of TWO years i.e. upto and inclusive of April - May 2021 Examinations. Thereafter, they will be permitted to appear for the examination only under the Regulations then in force.

APPENDIX – 32 (S)
UNIVERSITY OF MADRAS

SRI SANKARA ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)

B.Sc., COMPUTER SCIENCE
(effective from the academic year 2018 – 2019

SYLLABUS

FIRST SEMESTER

Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks	
					CIA	UE
PART I	Tamil – I / Sanskrit –I	I	3	3	25	75
PART II	English – I	I	3	3	25	75
PART III	Allied Maths – I	I	5	3	25	75
PART III	Programming In C	I	4	3	25	75
PART IV	Softskill – I	I	3	2	50	50

PART IV	Non-Major Elective – I	I	2	2	25	75
PART III	C Programming Lab	I	4	3	40	60

SECOND SEMESTER

Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks	
					CIA	UE
PART I	Tamil – II / Sanskrit – II	II	3	3	25	75
PART II	English – II	II	3	3	25	75
PART III	Allied Maths – II	II	5	3	25	75
PART III	Digital Electronics and Microprocessor	II	4	3	25	75
PART IV	Non-Major Elective Lab	II	2	3	40	60
PART IV	Softskill – II	II	3	2	50	50
PART III	Practical II - Digital Electronics & Microprocessors Lab	II	4	3	40	60

THIRD SEMESTER

Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks	
					CIA	UE
PART I	Tamil – III / Sanskrit –III	III	3	3	25	75
PART II	English – III	III	3	3	25	75
PART III	Programming in C++ and Data Structures	III	4	3	25	75
PART III	Allied-Statistical methods & their Application -I	III	5	3	25	75
PART IV	ENVIRONMENTAL STUDIES	III	2	3	25	75
PART IV	Soft skill – 3	III	3	2	50	50
PART III	Practical – III : Data Structures using C++	III	4	3	40	60

FOURTH SEMESTER

Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks	
					CIA	UE
PART I	Tamil – IV / Sanskrit –IV	IV	3	3	25	75
PART II	English – IV	IV	3	3	25	75
PART III	Programming in Java	IV	4	3	25	75
PART III	Allied-Statistical methods & their Application -II	IV	5	3	25	75
PART IV	Soft skill – 4	IV	3	2	50	50
PART III	Java Programming Lab	IV	4	3	40	60

FIFTH SEMESTER

Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks	
					CIA	UE
PART III	Relational Database Management Systems	V	4	3	25	75
PART III	Object Oriented Analysis and Design	V	4	3	25	75
PART III	Operating Systems	V	4	3	25	75
PART III	Elective -I	V	5	3	25	75
PART III	RDBMS Lab	V	4	3	40	60
PART IV	Value Education	V	2	3	25	75

Elective - I

Software Engineering /Visual Programming /Software Project Management

SIXTH SEMESTER

Course components	Name of Course	Semester	Credits	Exam. Duration	Max. Marks	
					CIA	UE
PART III	Computer Network	VI	4	3	25	75
PART III	Web Technology	VI	4	3	25	75
PART III	Elective -II	VI	5	3	25	75
PART III	Elective -III	VI	5	3	25	75
PART III	Web Technology – Lab	VI	4	3	40	60
PART V	**Extension Activities**		1			

Elective - II

System Software /Data Mining /E-commerce

Elective -III

Digital Image Processing /Software Testing /Computer Graphics and Multimedia

Non –Major Elective: Semester - I

1. HTML
2. FLASH
3. MS ACCESS

Non –Major Elective: Semester - II

1. HTML - LAB
2. FLASH - LAB
3. MS ACCESS -LAB

FIRST SEMESTER

Core Paper Theory - 1			
Title of the paper with subject code	**Programming in C**		
Category of the course	Year	Semester	Credits
Core	I	I	4

OBJECTIVES : To impart basic knowledge of computer and developing programming skills in C.

UNIT 1: 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- graphic functions.

UNIT 2: 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 3: Functions –Definition - proto-types - Passing arguments - Recursions. Storage Classes - Automatic, External, Static, Register Variables – Multi-file programs.

UNIT 4: 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 5: 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- Error Handling During I/O operations – Random Access Files – Command Line Arguments.

RECOMMENDED TEXTS

i. E.Balaguruswamy,Programming in ANSI C, TMH Publishing Company Ltd.
ii. E.Balagurusamy, Programming in ANSI C, Tata McGraw-Hill Education Private Ltd., Fifth Edition, 2011.
iii. Kanetkar Y, Let us C -14th Edition -BPB Pub., New Delhi.

REFERENCE BOOKS

i. B.W. Kernighan and D.M.Ritchie, The C Programming Language, 2nd Edition, PHI.
ii. H. Schildt, C,2004, The Complete Reference, 4th Edition, TMH
iii. Gottfried,B.S, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi
iv. D. Ravichandran, Programming in C, New Age International (P) Ltd., -2009

Core Practical - 1			
Title of the paper with subject code	**Programming in C Lab**		
Category of the course	Year	Semester	Credits
Core	I	I	4

I BASIC PROGRAM

1. Area of rectangle, square and triangle
2. Odd or even of a given number
3. Simple interest and compound interest
4. Sum of digits of a given number

II SUMMATION OF SERIES

5. Sin(x),
6. Cos(x),
7. Exp(x) (Comparison with built in functions)

III STRING MANIPULATION

8. Counting the no. of vowels, consonants, words, white spaces in a line of text and array of lines
9. Reverse a string & check for palindrome.
10. Substring detection, count and removal
11. Finding and replacing substrings

IV RECURSION

12. n Pr, nCr

13. GCD of two numbers

14. Fibonacci sequence

15. Maximum & Minimum

16. Towers of Hanoi.

V MATRIX MANIPULATION

17. Addition & Subtraction
18. .Multiplication
19. Transpose, and trace of a matrix
20. Determinant of a Matrix
21. .Inverse of Matrix

VI SORTING AND SEARCHING

22. Insertion Sort

23. Bubble Sort

24. Linear Search

25. Binary Search

VII FILES

26. Mark Sheet using files.

27. Payroll

28. Electricity bill

SECOND SEMESTER

Core Paper Theory - 2			
Title of the paper with subject code	**Digital Electronics & Microprocessors**		
Category of the course	Year	Semester	Credits
Core	I	II	4

OBJECTIVES: This course introduces the concepts of fundamentals of Digital Electronics and Microprocessor.

UNIT 1: Binary Systems & Code conversion, Boolean Algebra & Logic Gates – Truth Tables – Universal Gates – Simplification of Boolean functions: SOP, POS methods – K-map, (up to 5 variables) - don't care conditions – Mc-Clausky tabulation method-Combinational Logic: Adders & Subtractors – Multiplexer – Demultiplexer - Encoder – Decoder.

UNIT 2: Sequential Logic: RS, Clocked RS, D, JK, Master Slave JK, T Flip-Flops – Shift Registers – Types of Shift Registers – Counters: Ripple Counter – Synchronous Counters – Up-Down Counter- ROM – PLA – Designing circuits using ROM/PLA

UNIT 3: Introduction to Microprocessors, Microcomputers, and Assembly Language – Microprocessor Architecture and Its Operations – Memory – I/O Devices – 8085 MPU –

Introduction to 8085 Instructions – Data Transfer Operations – Addressing Modes - Arithmetic, Logic and Branch Operations – Writing Assembly Language Programs .

UNIT 4: Time Delay Programs: Time Delay Using One Register – Using a Register Pair – Using a Loop within Loop Technique – Counter Design with Time Delay – Stack and Subroutines – 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 .

UNIT 5: 8085 Interrupt – Vectored Interrupts – Interfacing I/O Devices: Basic Interfacing Concepts – Interfacing Input Devices- Memory-Mapped I/O.

RECOMMENDED TEXTS

i.M. Morris Mano,2005, Digital Logic and Computer Design, Prentice-Hall of India Pvt. Ltd.

ii. Ramesh S. Gaonkar,Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition,Penram International Publishing (India) Pvt. Ltd.

iii. V. Vijayendran ,2004, Fundamentals of Microprocessor – 8085, S. Viswanathan (Printers & Publishers) Pvt. Ltd.

REFERENCE BOOKS

i. D. P. Leach and A. P. Malvino,2002,Digital Principles and Applications,5th Edition, Tata McGraw, Hill Publishing Co. Ltd.

ii. V. Vijayendran,2004,Digital Fundamentals,S. Viswanathan (Printers & Publishers) Pvt. Ltd.
iii. N. K. Srinath,2005, 8085 Microprocessor Programming and Interfacing,Prentice-Hall of India Pvt. Ltd.

Core Practical - 2			
Title of the paper with subject code	**Digital Electronics & Microprocessors Lab**		
Category of the course	Year	Semester	Credits
Core	I	II	4

DIGITAL ELECTRONICS:

1. Verification of Truth Table for AND, OR, NOT, NAND, NOR and EX-OR gates.
2. Realisation of NOT, AND, OR, EX-OR gates with only NAND and only NOR gates.
3. Karnaugh Map Reduction and Logic Circuit Implementation.
4. Verification of DeMorgan's Law.
5. Verification of associative law
6. Verification of distributive law
7. Implementation of Half-Adder and Half-Subtractor.

8. Implementation of Full-Adder and Full-Subtractor.

9. Four Bit Binary Adder

10. Four Bit Binary Subtractor using 1's and 2's Complement.

MICROPROCESSOR:

1. 8 Bit Addition and Subtraction.
2. 16 Bit Addition.
3. BCD Addition .
4. BCD Subtraction.
5. 8 Bit Multiplication.
6. BCD Multiplication.
7. 8 Bit Division.
8. Searching for an Element in an Array.
9. Sorting in Ascending and Descending Orders.
10. Finding Largest and Smallest Elements from an Array.
11. Reversing Array Elements.
12. Block Move.
13. Binary to Hexa Decimal
14. Hexa Decimal to Binary

THIRD SEMESTER

Core Paper Theory - 3			
Title of the paper with subject code	**Programming in C++ and Data Structures**		
Category of the course	Year	Semester	Credits
Core	II	III	4

OBJECTIVE: This course introduces the basic concepts of programming in C++ and Data Structures

UNIT 1: Introduction to C++; Principles of Object Oriented Programming: Software Crisis - software evolution - procedure oriented programming - object oriented programming paradigm - basic concepts and benefits of OOP - object oriented language - application of OOP - structure of C++ - applications of C++ ; Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Pointers - Functions in C++ - Main Function - Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions

UNIT 2: Classes and Objects; 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. Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations.

UNIT 3: Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments. Data Structures: Definition of a Data structure - primitive and composite Data Types, Asymptotic notations, Arrays, Operations on Arrays, Order lists.

UNIT 4: Stacks - Applications of Stack - Infix to Postfix Conversion, Recursion, Maze Problems - Queues - Operations on Queues, Queue Applications, Circular Queue. Singly Linked List - Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List - Operations, Applications.

UNIT 5: Trees and Graphs: Binary Trees - Conversion of Forest to Binary Tree, Operations - Tree Traversals; Graph - Definition, Types of Graphs, Hashing Tables and Hashing Functions, Traversal - Shortest Path; Dijkstra's Algorithm.AVL tree –B tree

RECOMMENDED TEXTS

i. E. Balagurusamy,Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd. - 6th Edition

ii. E.Horowitz and S.Shani,2012,Fundamentals of Data Structures in C++ , Galgotia Pub.2 nd Edition

iii. H.Schildt, C++,The Complete Reference-TMH Edition, - 4th Edition-2003

REFERENCE BOOKS

i. Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.

ii. R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C, PHI.2nd Edition

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

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

Core Practical - 3			
Title of the paper with subject code	**Programming in C++ and Data Structures Lab**		
Category of the course	Year	Semester	Credits
Core	II	III	4

1. Operator overloading (Unary and Binary).
2. Class and All types of Constructors.
3. Static function and Array of objects with static data.
4. Friend function and Friend class.
5. Single and Multilevel inheritance
6. Implementing derived class constructors.

7. Implement PUSH, POP operations of stack using Arrays.
8. Implement PUSH, POP operations of stack using Pointers.
9. Implement add, delete operations of a queue using Arrays.
10. Implement add, delete operations of a queue using Pointers.
11. Conversion of infix to postfix using stack operations
12. Postfix Expression Evaluation.
13. Addition of two polynomials using Arrays and Pointers.
14. Creation, insertion, and deletion in doubly linked list.
15. Binary tree traversals (in-order, pre-order, and post-order) using linked list.
16. Depth First Search and Breadth first Search for Graphs using Recursion.

FOURTH SEMESTER

Core Paper Theory - 4			
Title of the paper with subject code	**Programming In Java**		
Category of the course	Year	Semester	Credits
Core	II	IV	4

OBJECTIVE: To impart sound knowledge and programming skills in JAVA**.**

UNIT 1: Introduction to Java-Features of Java-Basic Concepts of Object Oriented Programming-Java Tokens-Java Statements-Constants-Variables-Data Types- Type Casting-Operators-Expressions-Control Statements: Branching and Looping Statements.

UNIT 2: Classes, Objects and Methods-Constructors-Methods Overloading-Inheritance-Overriding Methods-Finalizer and Abstract Methods-Visibility Control –Arrays, Strings and Vectors-String Buffer Class-Wrapper Classes.

UNIT 3: Interfaces-Packages-Creating Packages-Accessing a Package-Multithreaded Programming-Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization-Implementing the Runnable Interface .

UNIT 4: Managing Errors and Exceptions-Syntax of Exception Handling Code-Using Finally Statement-Throwing Our Own Exceptions- Managing Input/Output Files: Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes – Using Streams-Using the File Class-Creation of Files-Random Access Files-Other Stream Classes.

UNIT 5: Network basics –socket programming – proxy servers – TCP/IP – Net Address – URL –Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes- Working with Frames-Working with Graphics-

Working with Color-Working with Fonts-Using AWT Controls, Layout Managers and Datagrams -Java Utility Classes - Menus.

TEXT BOOKS:

i. E. Balagurusamy,2014,Programming with JAVA, 5th Edition,Tata McGraw-Hill Publishing Co.Ltd.

ii. Herbert Schildt,2014,The Complete Reference Java™ 2, 9th Edition,Tata McGraw-Hill Publishing Co. Ltd.

iii. Y. Daniel Liang ,2003, An Introduction to JAVA Programming, Prentice-Hall of India Pvt. Ltd.

REFERENCE BOOKS

i. Cay S. Horstmann and Gary Cornell,2005, Core Java™2 Volume I-Fundamentals, 7th Edition-Pearson Education.

ii. Ken Arnold, James Gosling and David Holmes,2003, The Java™ Programming Language, 3rd Edition, Pearson Education.

iii. Deitel, Paul, and Harvey Deitel. Java how to program. Prentice Hall Press, 2011.

Core Practical - 4			
Title of the paper with subject code	**Java Programming Lab**		
Category of the course	Year	Semester	Credits
Core	II	IV	4

APPLICATIONS:

1. Sort the given numbers using arrays.
2. Implement the FIND and REPLACE operations in the given multiple text
3. Find the student's percentage and grade using command line arguments.
4. Substring Removal from a String. Use String Buffer Class.
5. Determining the Perimeter and Area of a Triangle. Use Stream Class.
6. Determining the Order of Numbers Generated randomly using Random Class.
7. Usage of Calendar Class and Manipulation.
8. Implementation of Point Class for Image Manipulation.
9. String Manipulation Using Char Array.
10. Database Creation for Storing E-mail Addresses and Manipulation.
11. Usage of Vector Classes.
12. Interfaces and Packages
13. Implementing Thread based Applications and Exception Handling.

14. Application using Synchronization such as Thread based, Class based and Synchronized Statements.

15. Textiles (copy, display, counting characters, words and lines)

16. Data file creating and processing for electricity billing.

17. Data file creating and processing for telephone billing

APPLETS:

18. Working with Frames and Various Controls.

19. Working with Dialog Box and Menus.

20. Working with Colors and Fonts.

21. Drawing various shapes using Graphical statements.

22. Working with panel and all types of Layout.

23. Design a simple calculator with minimal of 10 operations

24. Usage of buttons, labels, text components in suitable application

25. Usage of Radio buttons, check box ,choice list in suitable application.

26. Develop an applet to play multiple audio clips using multithreading.

FIFTH SEMESTER

Core Paper Theory - 5			
Title of the paper with subject code	**Relational Database Management Systems**		
Category of the course	Year	Semester	Credits
Core	III	V	4

OBJECTIVE: To gain knowledge about the DML, DDL operations and to develop a Database with enhanced models and Techniques and to understand about RDBMS, Object oriented Databases and issues.

UNIT 1: Database management system: data basics and definitions – schemas and sub schemas tree and plex structures – file addressing – searching – type of database languages. Entity relationship model: entities and entity sets relationships – mapping constraints – E-R.Diagram

UNIT 2: Relational database management system: relational model – normalization and denormalization – relational structures – relational operators – relational database server architectures – online transaction procession (OLTP) – twelve rules (Codd's rules) – SQL – indexing – optimization – transaction management – locking – access control – data integrity – auditing – backup and recovery – data dictionaries.

UNIT 3: Oracle SQL: DDL, DML & TCL operations – integrity constraints – string functions – number functions – data arithmetic – conservation and transformation functions – pseudocolumns – grouping and ordering data – sub queries – joins – union, intersect & minus – indexes – clusters – views – sequences – synonym – users, roles and privileges – grant and revoke permission – locks.

UNIT 4: Pl/Sql: Pl/Sql structure – conditional and unconditional controls – loops – cursors – exceptions – stored procedures and functions – database triggers, Packages, SQL Loader.

UNIT 5: Front-end tools: SQL *plus – building a report in Sql, why front-end tools? Introduction to front-end – introduction to ODBC.

TEXT BOOKS:

1. James Martin , "Principles of database management"
2. Henry F. Korth & Abraham Silberschatz "Database system concepts"
3. A.J. Page "Relational database concepts selection and implementation"
4. George Koch & Kevin loney, "Oracle the complete reference"
5. Oracle Developer 2000" by Ivan Bayross

REFERENCE BOOKS

1. C.J.Date, "An introduction to database system"
2. Jeffrey D. Ullman, "Principles of database system"
3. Introduction to Oracle, Oracle Corporation Press.
4. Introduction to PL/SQL, Oracle Corporation Press.

Core Paper Theory - 6			
Title of the paper with subject code	**Object Oriented Analysis and Design**		
Category of the course	Year	Semester	Credits
Core	III	V	4

Unit-I: System Development - Object Basics - Development Life Cycle - Methodologies - Patterns - Frameworks - Unified Approach - UML.

Unit-II: Use-Case Models - Object Analysis - Object relations - Attributes - Methods - Class and Object responsibilities - Case Studies.

Unit-III: Design Processes - Design Axioms - Class Design - Object Storage - Object Interoperability - Case Studies.

Unit-IV: User Interface Design - View layer Classes - Micro-Level Processes - View Layer Interface - Case Studies.

Unit-V: Quality Assurance Tests - Testing Strategies - Object orientation on testing - Test Cases - test Plans - Continuous testing - Debugging Principles - System Usability - Measuring User Satisfaction - Case Studies.

Books for Study:

1. Ali Bahrami - Object Oriented Systems Development - McGraw Hill International Edition - 2008

2. Grady Booch- Object Oriented Analysis and design – Addison Wesley.-3rd Edition -2009

3. Mala, D. Jeya. Object Oriented Analysis and Design Using UML. Tata McGraw-Hill Education, 2013.

Reference Book:

1. Ramnath, Sarnath, and Brahma Dathan. Object-oriented analysis and design. Springer Science & Business Media, 2010.
2. Kahate, Atul. Object Oriented Analysis & Design. Tata McGraw-Hill Education, 2004.

Core Paper Theory - 7			
Title of the paper with subject code	**Operating System**		
Category of the course	Year	Semester	Credits
Core	III	V	4

OBJECTIVE : To provide fundamental concepts of all managements in an Operating System.

UNIT 1: Evolution of Operating System – Basic Concepts & Terminology – Operating System as Resource Manager – Views of Operating System – Types of Operating System – I/O Programming – Interrupt Structure & Processing: – Interrupt Types – Interrupt Mechanism – Interrupt Handler Processing.

UNIT 2: Single Contiguous Allocation – Example of Multiprogramming – Partitioned Memory Management – Paged Memory Management – Demand-Paged Memory Management –Segmented Memory Management – Segmented and Demand Paged Memory Management – Swapping and Overlays.

UNIT 3: Job Scheduling – Process Scheduling: Functions – Policies – Multiprocessor Systems –Process Synchronization – Deadlock – Avoidance – Prevention – Detection and Recovery – Banker's Algorithm – Mutual Exclusion – Semaphore Mechanism.

UNIT 4: Techniques for Device Management – Device Characteristics – Hardware Considerations – Channels – Control Units – I/O Traffic Controller – I/O Scheduler, I/O Device Handler.

UNIT 5: Simple File System – General Model of a File System – Logical File System – Physical File System – Security Threats and Goals – Security Policies and Mechanisms – Case Studies: MS-DOS & UNIX (Commands , System Calls & Implementation).

TEXT BOOKS:

1. Stuart E. Madnick & John J. Donovan, Operating Systems, TMH, Seventh Reprint, 2008.
2. H.M. Deitel, An Introduction to Operating Systems, Addison Wesley Publishing
    a. Company, Third Edition, 2007
3. William Stallings, Operating Systems, PHI, Second Edition, 2001

REFERENCE BOOK:

i. Stallings, William. Operating Systems: Internals and Design Principles| Edition: 8. Pearson, 2014.

ii. Dhamdhere, Dhananjay M. Operating Systems: A Concept-based Approach, 2E. Tata McGraw-Hill Education, 2006.

iii. Tanenbaum, Andrew S., and Herbert Bos. Modern operating systems. Prentice Hall Press, 2014.

iv. A.S. Godbole – Operating Systems – Tata McGraw Hill – Third Edition 2010..

Elective Paper Theory - 8			
Title of the paper with subject code	**Software Engineering**		
Category of the course	Year	Semester	Credits
Elective	III	V	5

OBJECTIVE

To provide knowledge of the various phases of software engineering process.

UNIT 1 : Introduction to Software Engineering: Definitions, 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 2 : Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Staffing Level Estimation – Estimating Software Maintenance Costs – Software Requirements Definition: The Software Requirements Specification – Formal Specification Techniques – State Oriented Notations- languages and processors for requirements specification.

UNIT 3 : Software Design: Fundamental design concepts – Modules and Modularization criteria – Design Notations – Design Techniques- Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection.

UNIT 4: Implementation Issues: Structured coding techniques – Coding Style – Modern programming language Features: Type checking – User-defined data types – Data abstraction – Scoping Rules **–** concurrency mechanisms.

UNIT 5 : Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – 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.

Recommended Texts

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

ii. Rajib Mall ,2004,Fundamentals of Software Engineering,2nd Edition, PHI.

iii. R.S.Pressman, Software Engineering – 2014 - 7th Ed., McGraw Hill.

Reference Books

i. Kotonya, Gerald, and Ian Sommerville. Requirements engineering: processes and techniques. Wiley Publishing, 1998.

ii. Leach, Ronald J. Introduction to software engineering. CRC Press, 2016.

Elective Paper Theory - 9			
Title of the paper with subject code	**Visual Programming**		
Category of the course	Year	Semester	Credits
Elective	III	V	5

OBJECTIVE

To provide knowledge of the programming with
the help of database concepts

UNIT 1 : Introduction to Windows , GUI concept, Concept of Event driven programming, TheVisual Basic IDE (5.50) ,Types of Visual Basic Projects, Visual Basic Editions, The Visual Basic Project Lifecycle, Project Files. Customizing a Form - Writing Simple Programs - Toolbox - Creating Controls - Name Property - Command Button - Access Keys - Image Controls - Text Boxes - Labels - Message Boxes - Grid - Editing Tools - Variables - Data Types - String - Numbers.

UNIT 2 : Displaying Information - Determinate Loops - Indeterminate Loops - Conditionals - Built-in Functions - Functions and Procedures.

UNIT 3 : Lists - Arrays - Sorting and Searching - Records - Control Arrays - Combo Boxes - Grid Control - Projects with Multiple forms - DoEvents and Sub Main - Error Trapping.

UNIT 4 : VB Objects - Dialog Boxes - Common Controls - Menus - MDI Forms - Testing, Debugging and Optimization - Working with Graphics.

UNIT 5 : Monitoring Mouse activity - File Handling - File System Controls - File System Objects - COM/OLE - automation - DLL Servers - OLE Drag and Drop.

BOOKS FOR STUDY:

1. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill - 1999.

2. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill – 1999

3. Steven, Holzner. "Visual Basic 6.0 Programming Black Book." (2007)

Elective Paper Theory - 10			
Title of the paper with subject code	**Software Project Management**		
Category of the course	Year	Semester	Credits
Elective	III	V	5

OBJECTIVE

To provide knowledge of the software project management concepts in detail study.

UNIT 1: Introduction to software project management Project: Definition – Contract Management – Activities Covered By Software Project Management - Overview Of Project Planning – Stepwise Project Planning.

UNIT 2: Project Evaluation : Strategic Assessment – Technical Assessment – Cost Benefit Analysis–Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

UNIT 3 : Software Development Life Cycle PlanIntroduction of SDLC, its importance and selection.. Project Schedule – Sequencing and Scheduling Activities –Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks Resource planning: Manpower planning and financial planning and other resources planning.

UNIT 4 : Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control. Creating Framework – Collecting The Data – Visualizing Progress – Cost Monitoring –Earned Value – Priortizing Monitoring – Getting Project Back To Target

UNIT 5 : Understanding Behavior Instruction In The Best Methods – Motivation – The Oldman – Hackman Job Characteristics Model – Working In Groups – Becoming A Team –Decision Making – Leadership – Organizational Structures – Stress –Health And Safety .

TEXT BOOK:

1. Bob Hughes, Mikecotterell, "Software Project Management", Third Edition, Tata McGraw Hill, 2004.

REFERENCES:

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, “Software Project Management”, Pearson Education.
3. Jalote, “Software Project Manangement in Practive”, Pearson Education, 2002.

Core Practical - 5			
Title of the paper with subject code	**RDBMS-Lab**		
Category of the course	Year	Semester	Credits
Core	III	V	4

1. Payroll
2. Mark sheet Processing
3. Savings bank account for banking
4. Inventory System
5. Invoice system
6. Library information system
7. Student information system
8. Income tax processing system
9. Electricity bill preparation system
10. Telephone directory maintenance.

SIXTH SEMESTER

Core Paper Theory - 11			
Title of the paper with subject code	**Computer Networks**		
Category of the course	Year	Semester	Credits
Core	III	VI	4

OBJECTIVE: To give the concepts of network model and the applications of various layers in the network model.

UNIT 1: Introduction – Uses of Computer Networks – Network Hardware – Network Software: Protocol Hierarchies – Design Issues for the Layers – Connection Oriented and Connectionless Services – Service Primitives Reference models: The OSI Reference Model – TCP/IP Reference Model.

UNIT 2: The Physical Layer: Guided Transmission Media – Public Switched Telephone Network – Structure of Telephone System – Trunks and Multiplexing – Switching - The Data link Layer: Data link layer Design Issues – Error Detection and Correction – Stop and Wait Protocol – Sliding Window Protocols.

UNIT 3: The Network Layer: The Network Layer Design Issues – Routing Algorithms: The Optimality Principle – Shortest Path Routing – Flooding – Distance Vector Routing

– Link State Routing – Hierarchical Routing – Broadcast Routing – Congestion Control Algorithms: General Principles of Congestion Control – Congestion Prevention Policies – Congestion Control in Virtual-Circuit Subnets and Datagram Subnets – Network Layer in the Internet: IP Protocol – IP addresses.

UNIT 4: The Transport Layer: The Transport Service – Elements of Transport Protocols – Internet Transport Protocols: Introduction to UDP – RPC – TCP: TCP Service Model – TCP Protocol – TCP Segment Header.

UNIT 5: The Application Layer: The DNS Name Space – E-mail: Architecture and Services – Message Formats – Network Security: Cryptography – DES – RSA – Communication Security : Firewalls – Virtual Private Networks.

TEXT BOOK

1. Andrew S. Tanenbaum, *Computer Networks*, Pearson Prentice Hall, Fourth Edition, 2003.
2. Behrouz A. Forouzan, *Data Communications and Networking*, Tata McGraw-Hill, Second Edition, 2003.
3. 2. William Stallings, *Data and Computer Communication*, PHI, Fifth Edition.

REFERENCE BOOKS

1. Larry L. Peterson & Bruce S. Davie, "Computer Networks - A systems Approach", 2nd Edition, Harcourt Asia/Morgan Kaufmann, 2000.

2. F. Halsall, 4th Edition -2005, Data Communications, Computer Networks and Open Systems, Addison Wessley.
3. D. Bertsekas and R. Gallagher, 2nd Edition, Data Networks, Prentice hall of India, New Delhi.
4. Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

Core Paper Theory - 12			
Title of the paper with subject code	**Web Technology**		
Category of the course	Year	Semester	Credits
Core	III	VI	4

OBJECTIVE:

To give the concepts of advanced programming languages and the applications of various programming languages.

UNIT 1: Introduction to` VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators – mathematical- comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – type casting variables - math functions –date functions – string functions –other functions -

VBScript Coding Conventions - Dictionary Object in VBScript - Err Object

UNIT 2: Introduction to Java script – Advantages of Java script – Java script syntax - Data type –Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box .

UNIT 3: Java script 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 4: ASP.NET Language Structure – Page Structure – Page event , Properties & Compiler Directives . HTML server controls – Anchor, Tables, Forms, Files . Basic Web server Controls – Label, 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.

UNIT 5: Request and Response Objects, Cookies, 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

RECOMMENDED TEXT BOOK

1. I.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.
3. .J.Jaworski, Mastering Javascript, BPB Publications.

Reference Books

1. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning
2. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications
3. T.A. Powell, 2002,Complete Reference HTML , TMH.
4. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition 2004, TMH

Elective Paper Theory - 13			
Title of the paper with subject code	**Systems Software**		
Category of the course	Year	Semester	Credits
Elective	III	VI	5

OBJECTIVE To provide knowledge of the system software concepts

UNIT 1: Introduction – System Sotware – Components of System software Evolution by System software – Model of Computer System; Introduction to software processors.

UNIT 2: Assemblers: Elements of Assembly language programming – Overview of the Assembly process – Design of Two-pass Assembler – A single pass Assembler for the IBM PC – Macros and Macro processors.

UNIT 3: Compilers: Aspects of compilation – Overview of the compilation process – Programming languages grammers – Scanning – Parsing – Storage allocation – Compilation of Expressions and Control structures – Code optimization – Compiler writing tools, Software processors for Interactive Environments.

UNIT 4: Loaders and Linkage Editors: Loading, linking and Relocation – Program relocatability – Overview of linkage editing – A linkage editor for the IBM PC – Linking for program over-lays.

UNIT 5: Software tools: Spectrum of software tools – Text editors – Interpreters and program generators – Debug monitors – Programming environments.

BOOK FOR STUDY:

1. Dhamdhere – Introduction to systems software – Tata Mc-Graw Hill.

REFERENCE:

1. Beck, Leland L. System software: an introduction to systems programming. Addison-Wesley, 1997.

2. System Software : Nityashri,(McGraw-Hill Education)
3. Hoover, Adam. "System Programming with C and UNIX." Learning 8.9 (2010)

Elective Paper Theory - 14			
Title of the paper with subject code	**Data Mining**		
Category of the course	Year	Semester	Credits
Elective	III	VI	5

OBJECTIVE To provide knowledge of the data mining and warehousing concepts.

UNIT 1: Introduction: Data mining – Functionalities – Classification – Introduction to Data Warehousing – Data Preprocessing : Preprocessing the Data – Data cleaning – Data Integration and Transformation – Data Reduction

UNIT 2: Data Mining, Primitives, Languages and System Architecture:

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

UNIT 3: Mining Association Rules: Basics Concepts – Single Dimensional Boolean Association Rules From Transaction Databases, Multilevel Association Rules from transaction databases – Multi dimension Association Rules from Relational Database and Data Warehouses.

UNIT 4: Classification and Prediction: Introduction – Issues – Decision Tree Induction – Bayesian Classification – Classification of Back Propagation. Classification based on Concepts from Association Rule Mining – Other Methods. Prediction – Introduction – Classifier Accuracy.

UNIT 5: Cluster Analysis: Introduction – Types of Data in Cluster Analysis, Petitioning Methods – Hierarchical Methods Density Based Methods – GRID Based Method – Model based Clustering Method.

RECOMMENDED TEXTS

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

REFERENCE BOOKS

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

WEBSITE, E-LEARNING RESOURCES

i http:// www.academicpress.com

ii. http://www.mkp.com

Elective Paper Theory - 15			
Title of the paper with subject code	**E-Commerce**		
Category of the course	Year	Semester	Credits
Elective	III	VI	5

OBJECTIVE To provide knowledge of the electronic marketing concepts.

UNIT 1: Electronic Commerce and Opportunities : Background The Electronic Commerce Environment – Electronic Marketplace Technologies – Modes of Electronic Commerce: Overview : Electronic Data Interchange.

UNIT 2: Approaches to Safe Electronic Commerce . Overview – Secure Transport Protocols – Secure Transaction – Secure Electronic Payment Protocol (SEPP) – Secure Electronic Transaction (SET)

UNIT 3: Certificates for Authentication – Security on Web Servers – Payment Schemes: Internet Monetary Payment and Security Requirements- Payment and purchase order process – Online electronic cash.

UNIT 4: Internet / Intranet Security Issues and Solutions : The Need for Computer Security – Specific Intruder Approaches – Security Strategies- Security Tools – Encryption – Enterprise Networking and Access to theInternet Antivirus Programs.- Security Teams

UNIT 5: MasterCard/Visa Secure Electronic Transaction : Introduction –Business Requirements – Concepts – payment Processing. E-mail and secure e-mail technologies for Electronic Commerce: Introduction _ The Means of Distribution – A model for Message Handling- MIME, S/MIME, MOSS , MIME and Related Facilities for EDI over the Internet.

RECOMMENDED TEXT BOOK:

1. Daniel Minoli & Emma Minoli, "Web Commerce Technology Handbook". Tata McGraw Hill – 1999.
2. K.Bajaj & D Nag , "E-Commerce", Tata McGraw Hill.
3. Mamta Bhusry – "E-Commerce"

Reference Book:

1. Ravi Kalakota and Andrew B. Whinston, Eleventh Impression, 2011,, Frontiers of Electronic Commerce, Pearson Education Inc., Delhi.
2. Marilyn Greenstein, Todd M Feinman - Electronic Commerce - Tata McGraw Hill - 2000.

Elective Paper Theory - 16			
Title of the paper with subject code	**Digital Image Processing**		
Category of the course	Year	Semester	Credits
Elective	III	VI	5

OBJECTIVE To provide knowledge of the digital image processing concepts.

UNIT 1: Introduction – steps in image processing, Image acquisition, representation, sampling and quantization, relationship between pixels. – color models – basics of color image processing.

UNIT 2: Image enhancement in spatial domain – some basic gray level transformations – histogram processing – enhancement using arithmetic , logic operations – basics of spatial filtering and smoothing.

UNIT 3: Image enhancement in Frequency domain – Introduction to Fourier transform: 1- D, 2 –D DFT and its inverse transform, smoothing and sharpening filters.

UNIT 4: Image restoration: Model of degradation and restoration process – noise models – restoration in the presence of noise- periodic noise reduction.. Image segmentation: Thresholding and region based segmentation.

UNIT 5: Image compression: Fundamentals – models – information theory – error free compression –Lossy compression: predictive and transform coding. JPEG standard.

RECOMMENDED TEXT BOOKS

1. R.C. Gonzalez, R.E.Woods, 2002, Digital Image processing, 2nd Edition, Pearson Education.
2. Anil K. Jain, 1994, Fundamentals of Digital image Processing, 2nd Edition, Prentice Hall of India, New Delhi.

3. Pratt. W.K., Digital Image Processing, 3rd Edition, John Wiley & Sons.

REFERENCE BOOKS

1. Rosenfled A. & Kak, A.C, 1982, Digital Picture Processing, vol .I & II, Academic Press.

Elective Paper Theory - 17			
Title of the paper with subject code	**Software Testing**		
Category of the course	Year	Semester	Credits
Elective	III	VI	5

OBJECTIVE To provide knowledge of the software and its testing concepts.

UNIT 1: Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.

UNIT 2: Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques – Data Flow Testing Strategies

UNIT 3: Domain Testing: Domains and Paths – Domains and Interface Testing – Linguistic –Metrics – Structural Metric – Path Products and Path Expressions.

UNIT 4: Syntax Testing – Formats – Test Cases – Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

UNIT 5: Verification and Validation – Fundamental Tools - Levels of Testing – Testing Approaches – Types of Testing – Test Plan – Software Testing Tools: WinRunner – Silk Test

RECOMMENDED TEXTBOOKS

1. B. Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi.

2. K.V.KK. Prasad, 2005, Software Testing Tools, DreamTech. India, New Delhi.

3. R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi.

REFERENCE BOOKS

1. Burnstein, 2003, Practical Software Testing, Springer International Edn.
2. E. Kit, 1st Edition- 2002, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
3. Mathur, Aditya P. "Foundations of software testing." Copymat Services (2006).

WEBSITE, E-LEARNING RESOURCES

http://www.amazon.com/gp/reader/0201877562/ref=sib_dp_pt/102-1957971-9723354#reader –link

Elective Paper Theory - 18			
Title of the paper with subject code	**Computer Graphics and Multimedia**		
Category of the course	Year	Semester	Credits
Elective	III	VI	5

OBJECTIVE To provide knowledge of the Computer graphics and multimedia concepts.

UNIT 1: Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. Attributes of Output Primitives: Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT 2: 2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. 2D Viewing: The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.

UNIT 3: Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

UNIT 4: Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission– Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia –Voice Recognition and Response - Audio Processing Software.

UNIT 5: Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. Compression: MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.

BOOK FOR STUDY:

1. Donald Hearn, M.Pauline Baker, "Computer Graphics" , 2nd edition, PHI.
2. Ranjan Parekh, "Principles of Multimedia" , 2007, TMH.
3. D.P. Mukherjee ,Fundamentals of Computer Graphics and Multimedia , 1st Edition,Prentice-Hall of India Pvt. Ltd

REFERENCES:

1. Amarendra N Sinha, Arun D Udai, "Computer Graphics", TMH.
2. Tay Vaughan, " Multimedia: Making it Work" , 7th edition, TMH.

Core Practical - 5			
Title of the paper with subject code	**Web Technology**		
Category of the course	Year	Semester	Credits
Core	III	VI	4

1. Write a program outputs the squares, roots, cubes and complements of integers between 1 and 100.

2. Create a calculator.

3. Write a script to Sort numbers and strings

4. Create a program to generate a hit counter

5. Create a program to verify whether email address provided by user is valid or invalid.

6. Write a program to scroll the text on status bar.

7. The form consists of two multiple choice list and one single choice list

a. The first multiple choice list display the major dishes available.

b. The second Multiple choice list display the stocks available.

c. The single choice list display the miscellaneous (Milkshakes, soft drinks,

softy available etc.)

8. Write a sript to create a digital clock.

9. 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, onDblclick handler

10. 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

11. 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:

Yahoo (http://www.yahoo.com)

Altavista (http://www.altavista.com)

Infoseek (http://www.infoseek.com)

3. When the user clicks on of the option buttons, the frame on the right hand side should be loaded with the right search engine.

12.Write a program to implement Employee database with all validation

ASP

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 using command object in ASP

3. Develop an application to illustrate the usage of Request and Response Objects in ASP.

4. Write an ASP program using Request Object to give the exact list of headers sent by the browser to the Web server.

5. Create an Active Server Page to display the records one by one from a student database. The student database should contain roll no, name, marks & total.

6. Design an ASP application that describes books in the Online Bookshop.(Use AD Rotator Component, Content Rotator Component, Content Linking Component)

7. Create a document and add a link to it. When the user moves the mouse over the link it should load the linked document on its own (User is not required to click on the link).

8. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.

9. Create a document that accepts the user's name in a text field form and displays thesame the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

NON –MAJOR ELECTIVE: SEMESTER - I

HTML

UNIT 1: Introduction :Web Basics: What is Internet – Web browsers – What is Web page – HTML Basics: Understanding tags.

UNIT 2: 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 3: Lists: Types of lists: Ordered, Unordered – Nesting Lists – Other tags: Marquee, HR, BR- Using Images – Creating Hyperlinks.

UNIT 4 : Tables: Creating basic Table, Table elements, Caption – Table and cell alignment – Rowspan, Colspan – Cell padding.

UNIT 5 : Frames: Frameset – Targeted Links – No frame – Forms : Input, Textarea, Select, Option.

RECOMMENDED TEXT BOOK

(i). HTML Complete Reference, Teach Yourself Web Publishing with HTML – Laura Lemay.

REFERENCE BOOKS

(i). HTML – E Stephen Mack, Janan Platt.

FLASH

UNIT 1: Introduction to Flash – simple drawing techniques – adding some easy animations –learning the tools - buttons

UNIT 2: Controlling drawing object – creating symbols – instances- making use of Library –painting – motion guide path.

UNIT 3: Flash tweening – suing masking techniques – layers and frames.

UNIT 4: Overview of animation -Animating your production – sound – video - publish flash movies – importing.

UNIT 5: Introduction to scripting - Action script applications

REFERENCE BOOK:

1. Mr. K. K. Thyagharajan, A.P., **.** B. **Anbumani**, K.K, "**Flash** 2004" **.**4 Robert Reinhardt, Flash 5 Bible

MS ACCESS

UNIT 1: Introduction to database - What is a Database , Why use a Relational Database, Overview of database design – Data Normalization(Determining tables, Determining Fields, Determining Relationships)Integrity Rules (Primary/Foreign Key, One-to-Many, Many-to-Many, One-to-One) Introduction to MS Access .

UNIT 2: Create a Table in MS Access - Data Types, Field Properties , Fields:names, types, properties--default values, format, caption, validation rules Data Entry Add record delete recode and edit text Sort, find/replace, filter/select, re-arrange columns, freeze columns . Edit a Tables- copy, delete, import, modify table structure find replace.

UNIT 3: Setting up Relationships- Define relationships, add a relationship, set a rule for Referential Integrity, change the join type, delete a relationship, save relationship Queries & Filter – difference between queries and filter , filter using multiple fields AND,OR , advance filter Queries create Query with one table , fiend record with select query, find duplicate record with query , find unmatched record with query, run query ,save and change query.

UNIT 4: Introduction to Forms Types of Basic Forms: Columnar, Tabular, Datasheet, Main/Subforms, add headers and footers, add fields to form, add text to form use label option button, check box ,combo box, list box Forms Wizard, Create Template.

UNIT 5: Introduction to Reports , Types of Basic Reports: Single Column,Tabular Report Groups/Total, single table

report multi table report preview report print report, Creating Reports and Labels, Wizard

REFERENCE BOOKS

1. A first course in Computers , Sanjay Saxena, Vikas Publishing house Pvt Ltd.,New Delhi
2. Ms Office XP complete BPB Publications
3. Ms Access 2002 fast and easy by Faithe Wempen PHI

HTML - LAB

01. Write a script to create an array of 10 elements and display its contents.

02. Create a simple calculator using form fields. Have two fields for number entry and one field for the result. Allow the user to be able to use plus, minus, multiply and divide.

03. Create a document and add a link to it. When the user moves the mouse over the link, it should load the linked document on its own. (user is not required to click on the link)

04. Create a document which opens a new window without a toolbar, address bar or a status bar that unloads itself after one minute.

05. Design an HTML page that includes document structure tags, title, line break, multiple headings and link to e-mail address.

06. Create an HTML file which is the main page with an image and some text messages along with hyperlinks which is linked to various pages. The navigation should be such that the links take you to the appropriate page and then back to the main page.

07. Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.

08. Design an application for pay slip through HTML forms.

FLASH - LAB

1.Drawing a Semi Circle by snap tool, a sine wave , 24 spokes on a wheel, five pointed star using , a flower by changing the center coordinates

2.Placing a text along a curved path.

3. Changing on objects shape using shape tweening , text tweening,

4. Application using buttons, animating the button

5. Tweening a using the shape hints , motion tweening

6. An application to show the masking effect in Flash

7.Slide show presentation (minimum 5 slides)

8.Creating smudge effect for an image using Hybrid Tweening.

9.Applications using Action scripts

10. Usage of textbox, dynamic text box, buttons with action scripts

MS ACCESS –LAB

1. Pay Bill
2. Electricity Bill
3. Mark list preparation of a student
4. Inventory report preparation
5. Invoice report preparation
6. Income tax preparation