SRI SANKARA ARTS & SCIENCE COLLEGE

DEPARMENT OF COMPUTER SCIENCE

M.Sc. DEGREE COURSE IN COMPUTER SCIENCE AND TECHNOLOGY (FIVE YEAR INTEGRATED COURSE)

CHOICE BASED CREDIT SYSTEM

REGULATIONS

1. ELIGIBILITY FOR ADMISSION:

Candidates seeking admission to the first year of the integrated M.Sc. Computer Science and Technology course shall be required to have passed Higher Secondary Examination conducted by Government of Tamil Nadu or an examination accepted as equivalent thereto by the syndicate, with Mathematics & Physics.

2. ELIGIBILITY FOR THE AWARD OF DEGREE

1. B.Sc CST

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.

2. M.Sc CST

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 five academic years, passed the examinations of all the ten Semesters prescribed earning 230 (140+90) credits

in Parts-I, II, III, IV & V 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.

3. 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 shall comprise the third and fourth semesters, the third academic year shall comprise the fifth and sixth semesters, the fourth academic year shall comprise the seventh and eighth semester, the fifth academic year shall comprise the nineth and tenth 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, Courses 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.

4. MEDIUM OF INSTRUCTION

The medium of instruction shall be English.

5. COURSE OF STUDY

A Master'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 Master'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), (v) Extension activities.

The detail of the Study for Master 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 PG degree Programme, a candidate must undergo a minimum of 2 papers (2 x 2 = 4 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.

PART – VII Internship

Each PG student shall appear for intenship training during the vacation of II Semester for a minimum period of 15 days and shall submit the report to the controller of examinations. Each student is allotted 4 credits on submission of the report.

The following procedure be be followed for Internal Marks:

Theory Papers: Internal Marks

Best Two tests out of 3	10 marks
Attendance	5 marks
Seminar	5 marks
Assignment	5 marks
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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 Best Test 2 out of 3	30 marks
Record	5 marks

Project:

Internal Marks	Best 2 out of 3 presentations	20 marks
Viva		20 marks
Project Report		60 marks

6. REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTERS:

(i) Candidates shall register their names for the First semester examination after the admission in the PG courses.

(ii) Candidates shall be permitted to proceed from the First Semester upto the 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 subjects of earlier semesters along with current (subject) Semester subjects.

(iii) Candidates shall be eligible to proceed to the subsequent semester, only if they earn, sufficient attendance as prescribed therefore by the Syndicate from time to time.

Provided in case of candidate earning less than 50% of attendance in any one of the semester due to any extraordinary circumstance 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 candidate 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 University from time to time.

7. PASSING MINIMUM:

a) There shall be no Passing Minimum for Internal.

b) For External Examination, Passing Minimum shall be of 50%(Fifty Percentage) of the maximum marks prescribed for the paper.

c) In the aggregate (External + Internal) the passing minimum shall be of 50% for each Paper/Practical/Project and Viva-voce.

d) Grading shall be based on overall marks obtained (internal + external).

For M.Sc. Degree Course in Computer Science & Technology (5 year Integrated course)
B.Sc. Degree Course in Computer Science and Technology

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.

8. CLASSIFICATION OF SUCCESSFUL CANDIDATES:

Candidates who secured not less than 60% of aggregate marks (Internal + External) in the whole examination shall be declared to have passed the examination in the First Class.

All other successful candidates shall be declared to have passed in Second Class.

Candidates who obtain 75% of the marks in the aggregate (Internal + External) shall be deemed to have passed the examination in First Class with Distinction, provided they pass all the examinations (theory papers, practicals, project and viva-voce) prescribed for the course in the First appearance.

9. GRADING SYSTEM:

The term grading system indicates a Seven (7) Point Scale of evaluation of the performances of students in terms of marks obtained in the Internal and External Examination, grade points and letter grade.

SEVEN POINT SCALE (As per UGC notification 1998)

GRADE	GRADE POINT	PERCENTAGE EQUIVALENT
`O' = Outstanding	5.50 – 6.00	75 – 100
`A' = Very Good	4.50 – 5.49	65 – 74
`B' = Good	3.50 – 4.49	55 – 64
`C' = Average	3.00 – 3.49	50 – 54
`D' = Below Average	1.50 – 2.99	35 – 49
`E' = Poor	0.50 – 1.49	25 – 34
`F' = Fail	0.00 – 0.49	0 - 24

10. 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 under "Requirements for Proceeding to subsequent Semester" are only eligible for Classification.

11. PATTERN OF QUESTION PAPER:

PART –A (50 words):Answer 10 out of 12 Questions 10 x 1 = 10 marks

PART –B (200 words):Answer 5 out of 7 Questions 5 x 5 = 25 marks

PART –C (500 words):Answer 4 out of 6 Questions 4 x 10 = 40 marks

12. INSTANT EXAMINATION

Candidates who have passed all the theory papers upto 3rd semester and failed in only one paper pertaining to the 4th semester can apply for Instant Examination. Application form with a demand draft for Rs.400/-, drawn in favour of "The Principal, Sri Sankara Arts and Science College, Enathur" should be submitted on or before 10 days after the publication of results. The results are published within 15 days after the date of examinations.

13. 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 50 % (Fifty 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 50%.

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 90 CREDITS in Parts-I, II, III, IV & V. He / She shall also complete one certificate course to qualify for the Degree.

A candidate who fails in any of the unit / project work / Project Report / dissertation / vivavoice shall reappear in that unit / project work / Project Report / Dissertation / viva-voice and pass the examination subsequently.

14. **CLASSIFICATION OF SUCCESSFUL CANDIDATES**

PART- I CORE SUBJECTS (COURSE): Successful candidates passing the Examinations for the Language and securing the marks 60 percent and above in the aggregate shall be declared to have passed the examination in the FIRST Class. All other successful candidates shall be declared to have passed the examination in the SECOND Class.

PART – II ELECTIVE SUBJECTS (COURSE): Successful candidates passing the examinations for English and securing the marks 60 percent and above in the aggregate shall be declared to have passed the examination in the FIRST Class. All other successful candidates shall be declared to have passed the examination in the SECOND class.

PART – III Soft skill

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

PART – IV INTERNSHIP

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

15. 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 11(iii) category are only eligible for Classification.

16. APPEARANCE FOR IMPROVEMENT

Candidates who have passed in a theory paper / papers are allowed to appear again for theory paper / papers only once in order to improve his/her marks, by paying the fee prescribed from time to time. Such candidates are allowed to improve within a maximum period of 10 semesters counting from his/her first semester of his/her admission. If candidate improve his marks, then his improved marks will be taken into consideration for the award of Classification only. Such improved marks will not be counted for the award of Prizes / Medals, Rank and Distinction. If the candidate does not show improvement in the marks, his previous marks will be taken into consideration. No candidate will be allowed toimprove marks in the Practical, Project, Viva-voce, and Field work.

17. CONDONATION

Students must have 75% of attendance in each course for appearing the examination. Students who have 74% to 70% of attendance shall apply for condonation in the prescribed formwith the prescribed fee Rs.200/-.Students who have 69% to 60% of attendance shall apply for condonation in prescribed form with the prescribed fee along with the Medical Certificate. Students who have below 60% of attendance are not eligible to appear for the examination. They shall re-do the semester(s) after completion of the programme.

18. RETOTALING

Candidates are permitted to apply for retotaling within 10 days from the date of publication of results. The student should submit request for retotaling in the prescribed format.and pay the fee prescribed per paper.

19. PHOTOCOPY OF ANSWER SCRIPT

Candidates are permitted to apply for obtaining a photocopy of answer paper within 20 days from the date of publication of results. The student should submit request for photocopy of answer script in the prescribed format.

20. REVALUATION

Candidates are permitted to apply for revaluation after obtaining a photocopy of answer paper within 30 days from the date of publication of results. The student should submit request for revaluation in the prescribed format and pay the fee prescribed per paper.

21. MALPRACTICE

Any malpractice by the students debars them from subsequent appearance based on the decision of the examination committee. In all cases of malpractice their conduct certificates will indicate malpractice.

22. EVALUATION AND GRADING SYSTEM

The performance of a student in each paper is evaluated in terms of percentage of marks with a provision for conversion to grade points (GP). Evaluation for each paper shall be done by a continuous internal assessment by the concerned paper teacher as well as by an end semester examination and will be consolidated at the end of the course.

The term grading system indicates a Ten Point Scale of evaluation of the performances of students in terms of marks obtained in the Internal and External Examination, grade points and letter grade.

Once the marks of the Internal and end-semester examinations for each of the papers are available, they will be added. The marks thus obtained will then be graded as per details provided in Table.

The sum of total performance in each semester will be rated by Grade Point Average (GPA) while the continuous performance from the second semester onwards will be marked by Cumulative Grade Point Average (CGPA). These two are calculated by the following formulae.

$$\text{GPA} = \frac{\text{Sum of [Credits acquired x Grade points]}}{\text{Sum of Credits acquired}}$$

For the calculation of Grade Point Average (GPA), Gi is the grade point awarded; Ci is the credit units earned for the ith paper.

$$\text{CGPA} = \frac{\sum_{i=1}^{n} C_i GP_i}{\sum_{i=1}^{n} C_i}$$

where 'Ci' is the Credit earned for the paper i in any semester ; 'Gi' is the Grade Point obtained by the student for the paper i and 'n' is the number of papers passed in that or CGPA = GPA of all the papers starting from the first semester to the current semester.

Note: The GPA and CGPA shall be calculated separately for the following five parts:

Part I: Core Subject; Part II: Elective Subject, Part III: Skill based subjects, Part IV: Internship and Part V: Certificate course

Marks	Grade Point	CGPA	Letter Point	Classification of Final Result
96 and above	10	9.51 and above	S^+	First Class with Exemplary
91 – 95	9.5	9.01 – 9.50	S	
86 – 90	9.0	8.51 – 9.00	D^{++}	First Class with Distinction
81 – 85	8.5	8.01 – 8.50	D^+	
76 – 80	8.0	7.51 – 8.00	D	
71 – 75	7.5	7.01 – 7.50	A^{++}	First Class
66 – 70	7.0	6.51 – 7.00	A^+	
61 – 65	6.5	6.01 – 6.50	A	
56 – 60	6.0	5.51 – 6.00	B^+	Second Class
51 – 55	5.5	5.01 – 5.50	B	
46 – 50	5.0	4.51 – 5.00	C^+	Third Class
40 – 45	4.5	4.00 – 4.50	C	
Below 40	0	Below 4.00	F	Fail

The grade card / mark sheet issued at the end of the semester to each student will contain the following:

a. the marks obtained for each paper registered in the semester

b. the credits earned for each paper registered for that semester

c. the performance in each paper by the letter grade point obtained

d. the Grade Point Average (GPA) of all the papers registered for that semester and

e. from the second semester onwards, the Cumulative Grade Point Average (CGPA) of all the papers and

f. the class and grade of the student in the final CGPA

23. TRANSITORY PROVISION

Candidates who have undergone the course of study prior to the academic year 2008-2009 will be permitted to appear for the examinations under those Regulations for a period of three years i.e., up to and inclusive of April/May 2012 Examinations. Thereafter, they will be permitted to appear for the examination only under the Regulations then in force.

***M.Sc. COMPUTER SCIENCE AND TECHNOLOGY (5 YEAR INTEGRATED)**

Structure of the Course and Evaluation Pattern:

If a candidate is unable to continue this course after the sixth semester, he/she will be awarded B.Sc.(Computer Science & Technology) provided he/she has passed in all subjects up to VI Semester.

M.Sc. DEGREE COURSE IN COMPUTER SCIENCE AND TECHNOLOGY (FIVE YEAR INTEGRATED COURSE)

I Semester

Subject code	Name of the Subject	Credits
Part –I, Paper I	Language – I*	3
Part – II, Paper I	English - I*	3
Part - III Allied–I: Paper I	Mathematics – I	5
Part - III Allied–II:Paper I	Applied Physics – I	5
Part - III	Fundamentals of Digital Computers	4
Non Major Elective / VI Tamil for non Tamil Students		2
Soft Skill		3

II Semester

Subject code	Name of the Subject	Credits
Part –I, Paper II	Language – II*	3
Part– II, Paper II	English - II*	3
Part - III Allied–I:Paper II	Mathematics – II	5
Part - III Allied–II:Paper II	Applied Physics – II	5
Part - III	Practical – I: Digital Lab	4
Non Major Elective / VI Tamil for non Tamil Students		2
Soft Skill		3

* Syllabus for Language I, II and English I & II shall be followed as prescribed for B.Com./B.C.A.

III Semester Theory

Subject Code	**Name of the Subject**	**Credits**	**Marks**	
			Int.	**Ext.**
Part - III	Computer Oriented Mathematics	4	25	75
Part - III	Internet and its Applications	4	25	75
Part - III	Microprocessors	4	25	75
Part - III	Programming in C	4	25	75
Soft Skill – III		3	40	60
Environmental Studies	Exam. In IV Semester			

PRACTICAL

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Practical – II : C Programming and : Microprocessors Lab	4	40	60

IV SEMESTER THEORY

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Software Engineering	4	25	75
Part - III	Data Structures	4	25	75
Part - III	Computer Graphics	4	25	75
Part - III	Programming in C++	4	25	75
Soft Skill – IV		3	40	60
Environmental Studies	Exam. In IV Semester	2		

PRACTICAL

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Practical III : Data Structures using C++	4	40	60

V SEMESTER THEORY

Subject Code	**Name of the Subject**	**Credits**	**Marks**	
			Int.	**Ext.**
Part - III	Database Management Systems	4	25	75
Part - III	Operating Systems	4	25	75
Part - III	Visual Programming	4	25	75
Part - III	Computer Networks	4	25	75
	Value Education	2		

PRACTICAL

Subject Code	**Name of the Subject**	**Credits**	**Marks**	
			Int.	**Ext.**
Part - III	Practical IV : RDBMS with Visual Programming Lab	3	40	60

VI SEMESTER THEORY[#]

Subject Code	**Name of the Subject**	**Credits**	**Marks**	
Part - III	Multimedia Systems	4	Int.	Ext.
Part - III	Java Programming	5	25	75
Part - III	Computer Architecture	5	25	75
Part - III	Object Oriented Analysis and Design	4	25	75
	Extension Activities	1		

PRACTICAL

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Practical – V : Java Programming Lab	3	40	60

VII SEMESTER THEORY#

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Advanced Java Programming	3	25	75
Part - III	Design and Analysis of Algorithms	4	25	75
Part - III	Web Technologies	3	25	75
	Elective I	4	25	75
Soft Skill – V		2	40	60

PRACTICAL

Subject Code	Name of the Subject	Credit	Marks	
			Int.	Ext.
Part - III	Practical VI: Advanced Java Programming Lab.	3	40	60
Part - III	Practical VII : Web Applications Lab.	3	40	60

ELECTIVE – I

1 Parallel Algorithms

2 Artificial Intelligence and Expert Systems

3 Systems Software

VIII SEMESTER THEORY#

Subject Code	Name of the Subject	Credit	Marks	
			Int.	Ext.
Part - III	Unix and Shell Programming	3	25	75
Part - III	Distributed Databases	4	25	75
Part - III	E-Commerce	3	25	75
Part - III	Information Security	3	25	75
	Elective II	4	25	75
Soft Skill – VI		2	40	60
Soft Skill – VII		2	40	60
Internship**	During Summer Vacation			

**** Internship will be carried out during the summer vacation of the fourth year and marks should be sent to the University by the College and the same will be included in the Ninth Semester Marks Statement.**

PRACTICAL

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Practical IX : Unix Lab	3	40	60

ELECTIVE II

1 Software Project Management

2 Fuzzy Logic

3 Computer Simulation and System Modelling

IX SEMESTER THEORY#

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Network Programming	3	25	75
Part - III	Software Testing	3	25	75
Part – III ED	Data Warehousing and Data Mining	3	25	75
	Elective III	4	25	75
	Elective IV	4	25	75
Soft Skill – VII		2	40	60
Internship		2		100

PRACTICAL

Subject Code	Name of the Subject	Credit	Marks	
			Int.	Ext.
Part - III	Practical X : Network Programming Lab	3	40	60

ELECTIVE III

1 TCP/IP Networks
2 Artificial Neural Networks
3 Windows Programming

ELECTIVE IV

1 CAD/CAM
2 Distributed Computing
3 Image Processing

X SEMESTER

Subject Code	Name of the Subject	Credits	Marks	
			Int.	Ext.
Part - III	Project	20	20	60+20

 # Soft Skill courses for IV and V year shall be opted by the students as per soft skills regulations for postgraduate courses.

SYLLABUS

Title of the Course/ Paper	Fundamentals of Digital Computers		
Part III	First Year & First Semester	Credit: 4	
Objective of the course	This course introduces the concepts of digital computer fundamentals		

Unit 1: Number System - Converting numbers from one base to another - Complements - Binary Codes – Binary logic - Logic gates – Truth Tables.

Unit 2: Boolean Algebra- Axioms- Theorems- Simplification of Boolean functions- Map Method- (upto 5 variables) - McClausky Tabulation Method.

Unit 3: Sequential Logic – RS,JK,D and T Flip-Flops – Registers - Shift Registers - Counters - Ripple Counters -Synchronous counters - Design of Counters.

Unit 4: Adders-Subtractors-Decoders-Encoders-Multiplexer-Demultiplexer- Design of circuits using decoders/multiplexers-ROM-PLA-Designing circuits using ROM/PLA

Unit 5 : Design of ALU – Design of Status Register - Design of Accumulator – Introduction to Computer design

1. Recommended Texts

(i) M. Morris Mano, 1994, Digital Logic and Computer Design, PHI, New Delhi.

(ii) T.C. Bartee, 1991, Computer Architecture and Logical design, Tata McGraw-Hill, New Delhi.

(iii) V. Vijayendran,2004,Digital Fundamentals,S. Viswanathan (Printers & Publishers) Pvt. Ltd.

Reference Books

i. Rafiquzzaman, Mohamed. *Fundamentals of digital logic and microcomputer design*. John Wiley & Sons, 2005.

ii. Boyce, Jefferson C. *Digital computer fundamentals*. Prentice Hall PTR, 1977.

Title of the Course/ Paper	Practical –I: Digital - Lab.		
Part III	First Year & Second Semester	Credit: 4	
Objective of the course	This course gives training in digital logic circuits.		

1. Study of logic gates
   a. Logic gates using discrete components
   b. Verification of truth table for AND, OR, NOT, NAND, NOR and EXOR gates
   c. Realisation of NOT, AND , OR, EX-OR gates with only NAND gates
   d. Realisation of NOT, AND , OR, EX-OR gates with only NOR GATES
2. Implementation of logic circuits
   a. Verification of associative law for AND, OR GATES
   b. Karnaugh's map reduction and logic circuit implementation
3. Adder and subtractor
   a. Verification of Demorgan's law
   b. Implementation of Half-adder and Half –subtractor
   c. Implementation of Full-adder and full-subtractor
   d. Four bit binary adder
   e. Four bits binary subtractor using 1s and 2s complement
4. Shift registers
   a. Implementation of shift register, serial transfer
   b. Ring counter
   c. 4 – bit binary counter
   d. BCD Counter
   e. Counters for arbitrary sequence

Title of the Course/ Paper	Internet and its Applications		
Part III	Second Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Internet fundamentals and its Applications		

Unit-I: Internet Concepts - Internet Services - Types of Accounts - Media for Internet - ISP - TCP/IP and Connection Software - - Disconnecting from the internet. Dial-up Networking - Setting up and internet Connection - Testing Connection

Unit-II: Contenders - Issues in high-speed Connection - Connecting via ISDN, ADSL and Cable Modem - Intranets - Components of an Intranet - Steps for Creating Intranet - Maintenance - Connecting LAN to Internet.

Unit-III: E-mails - Downloading E-mails - Signatures and Stationery - Web Based E-mail - E-mail tasks - Outlook Express - Sending and Receiving files using Eudora - Outlook Express and Pine - Multiple e-mail accounts - Sending form letters - Formatting e-mail - E-mail mailing lists.

Unit-IV: Forms of chat and Conferencing - Internet Relay Chat (IRC) - Chatting in Microsoft Chat and V.Chat - Starting and managing a channel - Web-based Chat - Direct Chat systems - MUDs, MOOs and mussles - Voice and Video Conferencing.

Unit-V: Elements of web - Browsers - Security and Privacy Issues - Purchasing Products Online with wallet programs - Netscape Navigator and Communicator - Microsoft Internet Explorer.

Books for Study:

1. Margaret Levine Young - Internet - The Complete Reference - Millennium Edition - TMH Edition - 1999.
2. Harley Hahn - The Internet - Complete Reference - Second Edition - TMH Edition.

Reference:

1. Deitel, Harvey M., Paul J. Deitel, and Tem R. Nieto. *Internet & world wide web*. Prentice Hall, 2002.

Title of the Course/ Paper	Microprocessors		
Part III	Second Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Microprocessors.		

Unit-I: Introduction to micro computers, microprocessors and assembly languages – micro processor architecture and its operations – 8085 MPU – 8085 instruction set and classifications

Unit-II: Writing assembly levels programs – programming techniques such as looping, counting and indexing addressing nodes – data transfer instructions – arithmetic and logic operations – dynamic debugging.

Unit-III: Counters and time delays – hexadecimal counter modulo10 counter – pulse timings for flashing lights – debugging counter and time delay program – stack – subroutine – conditional call and return instructions.

Unit-IV: BCD to binary and binary to BCD conversions – BCD to HEX and HEX to BCD conversions – ASCII to BCD and BCD to ASCII conversions – BCD to seven segment LED code conversions – binary to ASCII and ASCII to binary conversions – multi byte addition – multi byte subtraction – BCD addition – BCD subtraction – multiplication and division.

Unit-V: Interrupt – implementing interrupts – multiple interrupt 8085 – trap – problems on implementing 8085 interrupt – DMA memory interfaces – RAM & ROM – I/O interface – direct I/O memory trapped I/O.

Books for study:

1. R S Gaonkar – Microprocessor architecture – Programming and application with 8085/8080A – Wiley Eastern Limited – 1990
2. A Mathur – Introduction to Microprocessor – III Edition – Tata McGraw Hill Publishing Co. Ltd. – 1993

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

Reference Book:

i. Kumar, K. Udaya. *The 8085 Microprocessor: Architecture, Programming and Interfacing*. Pearson Education India, 2008.
ii. Srinath, N. K. *8085 MICROPROCESSOR: PROGRAMMING AND INTERFACING*. PHI Learning Pvt. Ltd., 2005.
Godse, DA Godse AP. *Microprocessors & Microcontrollers*. Technical publications, 2007

Title of the Course/ Paper	Programming in C		
Part III	Second Year & Third Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of C programming		

Unit-I: C fundamentals – character set – identifier and key works – data types – constants – variables – declarations – expressions – statements – arithmetic, unary, relational and logical, assignment and conditional operators – library functions.

Unit-II: Data input/output functions – simple c programs – flow of control – control structures – switch, break and continue, go to statements – comma operator.

Unit-III: Functions – defining, accessing functions – functions prototypes – passing arguments – recursions – storage classes – multi file programs.

Unit-IV: Arrays – defining and processing – passing arrays to functions – multidimensional arrays – arrays and string – structures – passing structures to functions – self referential structures – unions.

Unit-V: Pointers – declarations – passing pointers to functions – operation in pointers – pointer and arrays – arrays of pointers – structures and pointers – files: creating, processing, opening and closing – bit wise operations.

Books for study:

1. Gottfried B S – Programming with C – II Edition TMH Pub Co Ltd.
2. Kanetkar Y – Let us C - BPB Publication.
3. E.Balaguruswamy, 1995,Programming in ANSI C, TMH Publishing Company Ltd.

Reference Books

i.H. Schildt, 2004, The Complete Reference, 4th Edition, TMH

ii. Kamthane,2002,Programming with ANSI & Turbo C , First Edition,Pearson Education , New Delhi

Title of the Course/ Paper	Practical – II : C Programming and Microprocessors Lab.		
Part III	Second Year & Third Semester	Credit: 4	
Objective of the course	This course gives hands on training in C programming and Microprocessors		

1. Summation of series
   a. sin(x)
   b. cos(x)
   c. exp(x)
2. String manipulations
   a. Counting the number of vowels, consonants, words white spaces in a line of text and array of lines.
   b. Reverse a string & check for palindrome
   c. Sub string detection and count
   d. Sub string removal
   e. Find and replacing substrings
3. Recursion
   a. nPr
   b. nCr

c. GCD of two numbers
d. Maximum & minimum
e. Fibonacci sequence
f. Tower of Honoi

4. Matrix manipulation
    a. Addition & subtraction
    b. Multiplication
    c. Transpose
    d. Determinant of a matrix
    e. Inverse of a Matrix
5. Sorting and searching
    a. Insertion sort
    b. Bubble sort
    c. Selection sort
    d. Linear search
    e. Binary search

Microprocessors

1. Addition and subtraction
        a. 8 bit addition
        b. 16 bit addition
        c. 8 bit subtraction
        d. BCD subtraction
2. Multiplication and division
    a. 8 bit multiplication
    b. BCD multiplication
    c. 8 bit division
3. Sorting and searching
    a. searching for an element in a array
    b. Sorting in Ascending order

c. Finding largest and smallest elements from an array
d. Reversing array elements
e. Block move
f. Sorting in descending order

4. Code conversion: BCD to HEX and HEX to BCD
5. Application: Traffic signal controller

Title of the Course/ Paper	Software Engineering		
Part III	Second Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Life Cycle of Software		

Unit-I: The Product-The Process-Project Management Concepts-Software Projects And Project Metrics

Unit-II: Software Project Planning-Risk Analysis And Management-Project Scheduling And Tracking-Software Quality Assurance.

Unit-III: Software Configuration Management-System Engineering-Analysis Concepts and Principles-Analysis Modeling.

Unit-IV: Design Concepts And Principles-Architectural Designs-User Interface Design.

Unit-V: Component level Design-Software Testing Techniques-Software Testing Strategies-Technical Metrics For Software- projects management, tools - analysis and design tools - programming tools - integration and testing tool - Case studies.

Books for Study:

1. Roger S. Pressman - Software Engineering A Practitioner's approach – 5th edition - McGraw Hill.
2. Ian Sommerville – Software Engineering - 5th Edition – Addison Wesley.
3. Richard E.Fairly - Software Engineering Concepts - Tata McGraw-Hill book Company.

Reference book

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.

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

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

Title of the Course/ Paper	Data Structures		
Part III	Second Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of Data Structures		

Unit-I: Abstract Data Types – Asymptotic Notations- Complexity Analysis – Arrays – Representation of Arrays – Operations on Arrays - Ordered Lists - Polynomials.

Unit-II : Singly Linked Lists – Circular Linked Lists – Doubly Linked Lists – General Lists – Stacks – Queues – Circular Queues – Evaluation of Expressions .

Unit-III : Trees – Binary Trees – Binary Tree Traversals – Binary Tree Representations – Binary Search Trees – Threaded Binary Trees – Application of Trees (Sets) – Representation of Graphs – Graph Implementation – Graph Traversals- Application of Graph Traversals- Minimum Cost Spanning Trees – Shortest Path Problems .

Unit-IV: Internal Sorting – Optimal Sorting Time – Sorting Large Objects – Sorting with Tapes- Sorting with Disks.

Unit-V: Hashing – AVL Trees - Red-Black Trees – Splay Trees - B-Trees.

Books for study :

1. E.Horowitz, S.Sahni and Mehta – Fundamentals of Data Structures in C++ - Galgotia- 1999.
2. Gregory L.Heileman – Data Structures , Algorithms and Object Oriented Programming – Mc-Graw Hill International Editions – 1996.

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

Reference book

1. R. Kruse C.L. Tondo and B. Leung ,1997, Data Structures and Program design in C, PHI.
2. Cangsam,Auguenstein,Tenenbaum,Data Structures using C & C++,PHI
3. D.Samantha,2005, Classic Data Structures, PHI,New Delhi.

Title of the Course/ Paper	Computer Graphics		
Part III	Second Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Computer Graphics.		

Unit-I: Video Display Devices – Raster Scan Systems – Input Devices – Hard Copy Devices- Graphics Software – Output Primitives- Attributes of Output Primitives.

Unit-II: Two – Dimensional Transformation – Clipping – Window-view port mapping.

Unit-III: User dialogue – Input of Graphical Data- Input Functions- Input Device Parameters- Picture Construction Techniques- Virtual Reality Environments.

Unit-IV: Three Dimensional Concepts – 3D Transformations- 3D Viewing- Key Frame systems – General animation functions - morphing.

Unit-V: Visible-Surface Detection : Back-Face Detection - Depth- Buffer Method – Scan Line Method – A-Buffer Method- Properties of Light – Infinitive Color Concepts- RBG Color Models- Computer Animation.

Books for Study :

1. D.Hearn and M.P.Baker – Computer Graphics- Second Edition – PHI- 1996.
2. W.M.Neumann and R.F.Sproull – Principle of Interactive Computer Graphics- McGraw Hill – 1979.
3. Foley, Van Dan, Feiner, Hughes – Computer Graphics – Addison Wesley – 2000.

Reference book

1. D.P. Mukherjee ,1999,Fundamentals of Computer Graphics and Multimedia , 1st Edition,Prentice-Hall of India Pvt. Ltd
2. D.F.Rogers , 2001, Procedural Elements for Computer Graphics , 2nd Edition , Tata McGraw-Hill Publishing Co. Ltd..
3. Xiang and R.A. Plastock ,2002 ,Computer Graphics , Schaum's Outline Series, Tata McGraw-Hill Publishing Co.

Title of the Course/ Paper	Programming in C++		
Part III	Second Year & Fourth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of programming in C++		

. **Unit-I**: Principles of Object Oriented Programming (OOP) – Software Evaluation -- OOP Paradigm – Basic Concepts of OOP – Benefits of OOP – Applications of OOP.

Unit-II: Introduction to C++ - Principles of Object Oriented Programming - basic concepts and benefits of OOP - object oriented language - application of OOP Tokens – Keywords – Identifiers – Variables – Operators – Manipulators – Expressions and Control Structures – Pointers – Functions – Function prototyping – Parameters Passing in Functions – Values Return by Functions – Inline Functions – Friend and Virtual Functions.

Unit-III: Classes and Objects – Constructors and Destructors -- Operator overloading - Type Conversions – Type Conversions – Type of Constructors – Function Overloading.

Unit-IV: Inheritance – Types of Inheritance – Virtual Functions and Polymorphism Constructors in inheritance – Mapping Console I/O operations.

Unit-V: Files – File Streams – File operations – File pointer – Error Handling during file operations – Command line arguments.

Books for Study:

1. Stanley Lippmann, Josee Lajoie – C++ Primer – Third Edition – Addison Wesley.
2. Robert Lafore – Object Oriented Programming in Microsoft C++ - Galgotia
3. E. Balagurusamy,1995,Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.

Reference Book :

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

ii. Stroustrup, Bjarne. *The C++ programming language*. Pearson Education India, 1995.

Title of the Course/ Paper	Practical – III Data Structures using C++		
Part III	Second Year & Fourth Semester	Credit: 4	
Objective of the course	This course gives hands on training in C++ programming with data structures		

1. Implements PUSH,POP operations of stack using arrays.
2. Implements PUSH,POP operations of stack using pointers.
3. Implement add, delete operations of a queue using arrays.
4. Implement add, delete operations of a queue using pointers
5. Conversion of infix to postfix using stack operations.
5. Postfix expression evaluation.
6. Addition of two polynomials using Arrays and Pointers.
7. Polynomial multiplication using singly linked list
8. Creation , Insertion and deletion in doubly linked list.

10.Binary tree traversals (inorder, preorder and post order) using linked list and recursion.

11.Non- recursive inorder traversal

12.Non- recursive preorder traversal

13. Non- recursive postorder traversal

14. Depth first search for graphs using recursion

15.Breadth first search for graphs.

SEMESTER V

Title of the Course/ Paper	Database Management Systems		
Part III	Third Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the basic concepts of database management systems		

UNIT I: Advantages and Components of a Database Management Systems – Feasibility Study – Class Diagrams – Data Types – Events – Normal Forms – Integrity – Converting Class Diagrams to Normalized Tables – Data Dictionary- DBMS Models-The Hierarchical model-Network model-Relational model

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

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

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

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

Recommended Texts

i. G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

ii. Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.

iii. C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley - 2000

Reference Books

i. Abraham silberschatz,H.FKorth And S.Sudarshan- Database System Concepts McGraw HillPublication.

ii. Ullman, Jeffrey D. Principles of database systems. Galgotia publications, 1984.

iii. Abiteboul, Serge, Richard Hull, and Victor Vianu. Foundations of databases: the logical level. Addison-Wesley Longman Publishing Co., Inc., 1995.

Title of the Course/ Paper	Operating Systems		
Part III	Third Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the functions of operating systems.		

Unit-I: Introduction - Multiprogramming - Time sharing - Distributed system - real-time Systems - I/O structure - Dual-mode operation - Hardware protection - General system architecture - Operating system services - System calls - System programs - System design and implementation. **Process Management:** Process concept - Concurrent process - scheduling concepts - CPU scheduling

Unit-II: Process Management contd.: Scheduling algorithms, Multiple processors Scheduling - Critical section - Synchronization hardware - Semaphores, classical problem of synchronization, Interprocess communication. **Deadlocks:** Characterization, Prevention, Avoidance and Detection.

Unit-III: Storage management - Swaping, single and multiple partition allocation - paging - segmentation - pages segmentation, virtual memory - demand paging - page replacement and algorithms, thrashing. Secondary storage management - disk structure - free space management -

allocation methods - disk scheduling - performance and reliability improvements - storage hierarchy.

Unit-IV: Files and protection - file system organisation - file operations - access methods - consistency semantics - directory structure organisation - file protection - implementation issues - security - encryption.

Unit-V: Case Studies: MS-DOS and UNIX operating systems - Linux, windows 2000

Books for study:

1. A. Silberschatz and P.B. Galvin - Operating System Concepts - Addison-Wesley Publishing Company.
2. A.S. Godbole – Operating Systems – Tata McGraw Hill – 1999.
3. H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition,Addison Wesley.

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.

Title of the Course/ Paper	Visual Programming		
Part III	Third Year & Fifth Semester	Credit: 4	
Objective of the course	To inculcate knowledge on Visual Basic concepts and Programming.		

Unit-I: Introduction to Windows, GUI concept, Concept of Event driven programming, Types of Visual Basic Projects, Visual Basic Editions, The Visual Basic Project Lifecycle, and 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-II: Displaying Information - Determinate Loops - Indeterminate Loops - Conditionals - Built-in Functions - Functions and Procedures.

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

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

Unit-V: 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).

Title of the Course/ Paper	Computer Networks		
Part III	Third Year & Fifth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Networking		

Unit 1: Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, ATM, Ethernet and Wireless LANs - Physical layer - guided transmission media

Unit 2: Wireless transmission - Communication Satellites – Telephones structure –local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

Unit 3: Elementary data link protocols - sliding window protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

Unit 4: Network layer - design issues - Routing algorithms - Congestion control algorithms – IP protocol – IP Address – Internet Control Protocol.

Unit 5 : Transport layer - design issues - Connection management - Addressing, Establishing & Releasing a connection – Simple Transport Protocol – Internet Transport Protocol (TCP)- Presentation layer and applications- Presentation formatting – Data compression – Cryptographic Algorithms: RSA – DES- Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP.

1. Recommended Texts

(i) A. S.Tanenbaum, 2003, Computer Networks, Fourth Edition, - Pearson Education, Inc, (Prentice hall of India Ltd), Delhi.

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

(iii) Andrew S. Tanenbaum, "Computer Networks", Tata Mcgraw Hill, 3rd Edition

2. Reference Books

(i) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.

(ii) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.

(iii) D. Bertsekas and R. Gallagher, 1992, Data Networks, Prentice hall of India, New Delhi.

(iv) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

3. Website, E-learning resources

(i) http://authors.phptr.com/tanenbaumcn4/

Title of the Course/ Paper	Practical-IV: RDBMS with visual programming Lab.		
Part III	Third Year & Fifth Semester	Credit: 4	
Objective of the course	This course train the students to implement the database applications		

Students are advised to use the concepts like Data Normalization, Link between table by means of foreign keys and other relevant data base concepts for developing databases for the following problems. The implementation of each problem should have necessary input screen Menu-driven query processing and pleasing reports. The choice or RDBMS is left to the students. Necessary validations must be done after developing database.

1. Library Information Processing.
2. Students Mark sheet processing.
3. Telephone Directory maintenance.
4. Gas booking and delivering system.
5. Electricity Bill Processing.
6. Bank Transactions.
7. Pay roll processing.
8. Personal Information System.
9. Question Database and Conducting quiz.

SEMESTER VI

Title of the Course/ Paper	Multimedia Systems		
Part III	Third Year & Sixth Semester	Credit: 4	
Objective of the course	This course gives an exposure to Multimedia and its applications.		

Unit-I: What is Multimedia: Definitions - CD-ROM and the Multimedia Highway - Where to use Multimedia - Introduction to Making Multimedia: The stages of a Project - What You Need - Multimedia Skills and Training: The team - Macintosh and Windows Production Platforms: Macintosh Versus PC - The Macintosh Platform - The Windows Multimedia PC Platform - Networking Macintosh and Windows Computers- Hardware Peripherals: Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices

Unit-II: Basic Tools: Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image-Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools - Helpful Accessories - Making Instant Multimedia: Linking Multimedia Objects - Office Suites - Word Processors - Spreadsheets - Databases - Presentation Tools. Multimedia Authoring Tools: Types of Authoring Tools - Card-and-Page-Based Authoring Tools - Icon-Based Authoring Tools - Time-Based Authoring Tools - Object-Oriented Authoring Tools - Cross-Platform Authoring Notes

Unit-III: Text: The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Sound: The Power of Sound - Multimedia System Sounds - MIDI Versus Digital Audio - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your Multimedia Project - Toward Professional Sound: The Red Book Standard - Production Tips

Unit-IV: Images: Making Still Images -Color - Image File Formats. Animation: The Power of Motion - Principles of Animation - Making Animations That Work - Video: Using Video - How Video works - Broadcast Video Standards - Integrating Computers and Television - Shooting and Editing Video - Video Tips - Recording Formats - Digital Video.

Unit-V: Planning and Costing : Project Planning - Estimating - RFPs and Bid Proposals - Designing and Producing : Designing - Producing - Content and Talent : Acquiring Content - Using Content Created by Others - Using Content Created for a Project - Using Talent - Delivering : Testing - Preparing for Delivery - Delivering on CD-ROM - Compact Disc Technology - Wrapping It Up - Delivering on the World Wide Web.

Books for Study:

1. Tay Vaughan - Multimedia: Making it Work. - Fourth Edition - Tata McGraw-Hill Edition - 1999.
2. Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London - 1991.
3. John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.

References:

1. Gokul, S. "Multimedia Magic." (2002)

Title of the Course/ Paper	Java Programming		
Part III	Third Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Java Programming		

Unit-I: Introduction to Java - Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays - Operators - Control Statements.

Unit-II: Classes - Objects - Constructors - Overloading method - Access Control - Static and fixed methods - Inner Classes - String Class - Inheritance - Overriding methods - Using super- Abstract class.

Unit-III: Packages - Access Protection - Importing Packages - Interfaces - Exception Handling - Throw and Throws - Thread - Synchronization - Messaging - Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads - Multithreading.

Unit-IV: I/O Streams - File Streams - Applets - String Objects - String Buffer - Char Array - Java Utilities - Code Documentation.

Unit-V: Networks basics - Socket Programming - Proxy Servers - TCP/IP Sockets - Net Address - URL - Datagrams - Working with windows using AWT Classes - AWT Controls - Layout Managers and Menus.

Books for Study:

1. Cay S.Horstmann, Gary Cornell - Core Java 2 Volume I –Fundamentals - Addison Wesley.
2. P. Naughton and H. Schildt - Java2 (The Complete Reference) - Third Edition.
3. K. Arnold and J. Gosling - The Java Programming Language - Second Edition.

Reference Books

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

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

iii. E. Balagurusamy,2004,Programming with JAVA, 2nd Edition,Tata McGraw-Hill Publishing Co.Ltd.

Title of the Course/ Paper	Computer Architecture		
Part III	Third Year & Sixth Semester	Credit: 5	
Objective of the course	This course introduces the architecture of various computers and its organization		

Unit-I : Central Processing Unit : General Register and Stack Organization – Instruction Formats – Addressing Modes- Data Transfer and manipulation – Program Control – RISC.

Unit-II : Pipelining – Arithmetic , Instruction and RISC Pipelining- Vector Processing – Array Processors.

Unit-III : Computer Arithmetic- Addition and Subtraction – Multiplication and Division Algorithms – Floating Point and decimal Arithmetic operations.

Unit-IV : Input–Output Organization – Peripheral devices - I/O Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt - Direct Memory Access – I/O Processor – Serial Communications.

Unit-V : Memory Organization – Memory Hierarchy – Main Memory – Auxiliary Memory- Associative Cache and Virtual Memory - Interconnection Structures - Interprocessor Arbitration- parallel architectures- Data flow - Vector processors - EPIC - Case Studies.

Books for Study :

1.M.M.Mano – Computer System Architecture – 3 rd Edition – PHI – 1994.

2.J.P.Hayes – Computer System Architecture – McGrawHill – 1988.

3.D.A Patterson and J.L. Hennessy, Computer Architecture – A

References:

1. Vincent P. Heuring, Harry F. Jordan Computer Systems Design and Architecture, Addison Wesley, 1999.
2. Computer Architecture: A Quantitative Approach, David Patterson and John L. Hennessy
3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India, IV Edition

Title of the Course/ Paper	Object Oriented Analysis and Design		
Part III	Third Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces to UML, object oriented analysis and design of any application		

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 - 1999.
2. Grady Booch- Object Oriented Analysis and design –Addison Wesley.
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

Title of the Course/ Paper	Practical V- Java Programming Lab		
Part III	Third Year & Sixth Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Java Programming		

Application

1. Finding area and Perimeter of a circle. Use Buffered Reader class.
2. Substring Removal from a String. Use String Buffer Class.
3. Determining the order of numbers generated randomly using Random Class.
4. Implementation of Point Class for Image manipulation.
5. Usage of Calender Class and manipulation.
6. String Manipulation using Char Array.
7. Database Creation for storing e-mail addresses and manipulation.
8. Usage of Vector Classes.
9. Implementing Thread based applications & Exception Handling.

10.Application using synchronization such as Thread based, Class based and synchronized statements.

Applets

11.Working with Frames and various controls.

12. Working with Dialogs and Menus.

13. Working with Panel and Layout.

14. Incorporating Graphics.

15. Working with Colours and Fonts.

SEMESTER VII

Title of the Course/ Paper	Advanced Java Programming		
Part III	Fourth Year & Seventh Semester	Credit: 3	
Objective of the course	This course introduces the concepts of Java Programming in Advance		

Unit-I: Servlet overview – the Java web server – your first servlet – servlet chaining – server side includes- Session management – security – HTML forms – using JDBC in servlets – applet to servlet communication.

Unit-II: The software component assembly model – the Java beans development kit – developing beans – notable beans – using infobus – glasgow developments.

Unit-III: EJB architecture- EJB requirements- design and implementation- EJB session beans- EJB entity beans.

Unit-IV: EJB clients- deployment- tips,tricks and traps for building distributed and other systems- implementation and future directions of EJB.

Unit-V: Servlet and jsp programming – servlet life cycle – servlet API- HTML to servlet communication – introduction to JSP – JSP tags – sessions- Variable in pearl – pearl control structures and operators – functions and scope.

Books for Study:

1. Karl Moss - Java servlets – second edition– Tata McGraw Hill Edition.
2. Dustin R.Callaway-Inside Servlets - Addison Wesley.
3. Joseph O'Neil - Java Beans Programming –TMH.

Reference book:

1. TomValesky - Enterprise JavaBeans - Addison wesley.
2. Cay S Horstmann & Gary Cornell – Core Java – Vol II Advanced Features - Addison Wesley Pvt. Ltd. Indian Branch.
3. Herbert Schildt, 2002, Java 2 Complete Reference, 5th Edition, Tata McGraw Hill, New Delhi.

Title of the Course/ Paper	Design and Analysis of Algorithms		
Part III	Fourth Year & Seventh Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Design and Analysis of Algorithms		

Unit 1: Introduction - Definition of Algorithm – Important problem types - Fundamentals of the analysis of algorithm efficiency - – analysis frame work - pseudo code conventions – recursive algorithms – non-recursive algorithms- time and space complexity –big-"oh" notation – practical complexities – randomized algorithms – repeated element – primality testing - Divide and Conquer: General Method - Finding maximum and minimum – merge sort.

Unit 2: Divide and conquer – Quicksort, Selection, Strassen's matrix multiplication – Greedy Method: General Method –knapsack problem - Tree vertex splitting - Job sequencing with dead lines – optimal storage on tapes.

Unit 3: Dynamic Programming: General Method - multistage graphs – all pairs shortest paths – single source shortest paths - String Editing – 0/1 knapsack. Search techniques for graphs – DFS-BFS-connected components – biconnected components.

Unit 4: Back Tracking: General Method – 8-queens - Sum of subsets - Graph Coloring – Hamiltonian cycles. Branch and Bound: General Method - Traveling Salesperson problem.

Unit 5: Lower Bound Theory: Comparison trees - Oracles and advisory arguments - Lower bounds through reduction - Basic Concepts of NP-Hard and NP-Complete problems.

1. Recommended Texts

(i) E. Horowitz, S. Sahni and S. Rajasekaran, 1999, Computer Algorithms, Galgotia, New Delhi.

(ii) A.V. Aho, J.E. Hopcroft, J.D. Ullmann, 1974, The design and analysis of Computer Algorithms, Addison Wesley, Boston.

(iii) S.E.Goodman and S.T.Hedetniemi, 1977, Introduction to the Design and Analysis of algorithms, Tata McGraw Hill Int. Edn, New Delhi.

2. Reference Books

(i) G. Brassard and P. Bratley, 1997, Fundamentals of Algorithms, PHI, New Delhi.

3. Website, E-learning resources

(i) http://www.cise.ufl.edu/~raj/BOOK.html

Title of the Course/ Paper	Web Technologies		
Part III	Fourth Year & Seventh Semester	Credit: 3	
Objective of the course	This course introduces the concepts of ASP, VB Script , Java Script.		

Unit 1: Introduction to Javascript – Advantage of Javascript – Javascript Syntax – Datatype – Variable – Array – Operator and Expression – Looping Constructor – Function – Dialog box.

Unit 2: Javascript document object model – Introduction – Object in HTMl – Event Handling – Window Object – Document object – Browser Object – Form Object – Navigator object – Screen object – Build in Object – User defined object – Cookies

Unit 3: Features of C# - C# and .NET framework – Getting started – C# language fundamentals – classes and objects – Inheritance and Polymorphism –Interfaces-Arrays – Indexers and Collections – Strings and Regular Expressions – Handling Exceptions – Delegates and Events.

Unit 4: ASP. NET Language Structure – Page Structure – Page event, Properties & Compiler Directives. HTML server controls – Anchor, Tables, Forms, Files. Basic Web server Controls – Lable, Textbox, 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.

1. Recommended Texts

(i) I. Bayross, 200, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.

(ii) G.Buczek, 2002, ASP.NET Developers Guide, TMH.

(iii) Jesse Liberty, 2002, Programming C#", Second Edition, O'Reilly Press.

2. Reference Books

(i) J. Jaworski, 1999, Mastering Javascript, BPB Publications.

(ii) T. A. Powell, 2002, Complete Reference HTML (Third Edition),Tata McGraw-Hill, New Delhi.

(iii) Richard Anderson, Professional ASP.NET, Wrox Press Ltd.

(iv) Jeffrey Ritcher, 2002, Appplied Microsoft .NET framework Programming, Microsoft Press.

(v) Kumar Sanjeev and Shibi Panikkar, Magic of ASP.NET with C#, Firewall Media.

Title of the Course/ Paper	Practical – VI: Advanced Java Programming - Lab		
Part III	Fourth Year & Seventh Semester	Credit: 3	
Objective of the course	This course introduces the concepts of Java Programming in Advance		

BEANS PROGRAMMING

1. Write a quiz applet and use gauge bean to update the score
2. Create a time zone list and retrieve any time which is given with zone using java beans
3. Develop a bean program that display a sequece of images in the form of slide show
4. Create a bean that displays a 3D plot of the following function
   Z = f(x,y) = 0.01 *(x^2 – y^2)
5. Create a frame that instantiates the beans registers paints to receive color event notifications from selectors adds the beans to the frame and makes the frame visible
6. Create a bean that displays a pie chart and use pie customizer to update the pie chart
7. Develop a bean that takes date and year and represent it in the local language in the form of a calender For (Eg.) French , Italian etc

SERVLETS PROGRAMMING

1. Write a servlet to display
   a. IP address and Port no. of server
   b. The host name and address of the computer on which your browser visits
2. Use a servlet as RMI client to enable a method given
3. Using servlet create a form which contain a text area, checkbox, radio button, label and text field with buttons
4. Create a chat program that uses servlets to communicate with 2 machines.
5. Create a servlet that gets the date and time of the system

Title of the Course/ Paper	Practical –VII: Web Applications Lab		
Part III	Fourth Year & Seventh Semester	Credit: 3	
Objective of the course	This course gives training in web design and applications.		

1. Write a script to create an array of 10 elements and arrange them in the ascending or descending order.
2. Write a function in Javascript that takes a string and looks at it character by character and perform all the String manipulation..
3. Create a simple calculator which should perform all the mathematical operations.
4. Create a document and add a link to it. Create a new window on that document. When the user moves the mouse over the link , it should load the linked document on it.
5. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.
6. Create a Web form for an online library. This form must be able to accept the Membership Id of the person borrowing a book, the name and ID of the book, and the name of the book's author. On submitting the form, the user (the person borrowing the book) must be thanked and informed of the date when the book is to be returned. You can enhance the look of the page by using various ASP.NET controls.
7. Use a calendar control in the page to determine the current date (when the book is borrowed) and calculate the due date, which must be three weeks from the current date. Display the due date to the user.
8. Create an array containing the titles of five new movies. Use this array as a data source for a drop down list control. The page must be capable of displaying the selected movie title to the user when the user clicks on the submit button.
9. Create a virtual directory in IIS. Create a global.asax file and include the "Session_Start" and "Session_End" and, "Application_BeginRequest" and "Application_EndRequest"

events. Write a simple ASP.NET page and execute it in the browser. What is the output that you get?

10. Create an ASP.NET application. The application must consist of a form that accepts the user's credentials and validate the same. The user is then allowed to purchase items from the site by filling in a form. The user is finally informed when the purchased goods will be delivered to him/her.
    a. Create a single default error page for any errors occurring in the application.
    b. Use ASP.NET debugger to debug the application during its development
    c. Enable tracing for the application. Display the user entered data in the purchase form as trace information at the bottom of the purchase page.
    d. Switch off tracing for the application.
11. Create the Employee information and perform all the validator controls.

Title of the Course/ Paper	Elective – I Parallel Algorithms		
Part III	Fourth Year & Seventh Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Parallel algorithms		

Unit-I: Need for parallel computers, Modules of Computation, Analyzing Algorithms, Expressing Algorithms - Broadcast, All sum and selection algorithms on SIMD model - Searching a sorted sequence: EREW, CREW SMSIMD algorithms, Searching a Random sequence on shared memory SIMD, Tree and mesh interconnected computers.

Unit-II: Sorting on a Linear Array, Sorting on a Mesh, Sorting on EREW SIMD computer, MIMD Enumeration sort, MIMD Quick sort. Sorting on other Networks.

Unit-III: Matrix Transposition: Mesh Transpose, Shuffle Transpose, EREW transpose.
Matrix by matrix Multiplication: Mesh multiplication, Cube multiplication. Matrix by vector Multiplication: Linear Array Multiplication, Tree Multiplication.

Unit-IV: Solving Numerical problems, solving systems of Linear equations: An SIMD algorithm, An MIMD algorithm. Finding Roots of Nonlinear Equations: MIMD algorithm. Solving partial Differential Equations, Computing Eigen values.

Unit-V: Solving Graph Theoretical problems, Computing the connectivity matrix. Finding connected components, All-Pairs shortest paths, Traversing combinatorial spaces, sequential tree traversal. The minimal alpha-Beta Tree, MIMD Alpha-Beta algorithm, parallel cutoffs. Storage requirements.

Books for Study:

1. Selim G. AKL - The Design and Analysis of parallel algorithm - Prentice hall.
2. Michael Quinn - Parallel Algorithms - McGraw Hill.

Reference Book:

1. Xavier, C., and Sundararaja S. Iyengar. *Introduction to parallel algorithms*. Vol. 1. John Wiley & Sons, 1998.
2. Casanova, Henri, Arnaud Legrand, and Yves Robert. *Parallel algorithms*. CRC Press, 2008.

Title of the Course/ Paper	Elective – I Artificial Intelligence And Expert Systems		
Part III	Fourth Year & Seventh Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Artificial Intelligence And Expert Systems		

Unit-I : Introduction – Evaluation of Artificial Intelligence production Systems- search strategies Hill climbing back tracking graph search (Algorithm A and A*) properties of A* algorithm , monotone restriction specialised production systems – AO* algorithm.

Unit – II: Searching game trees : Minimax procedure alphabeta pruning – Introduction to predicate calculus Answer extraction – Introduction to Knowledge based systems – Knowledge Processing techniques- Knowledge inference techniques.

Unit – III: Expert System Definition – Various stages in developing expert system- Knowledge representation using sematicness, predicate calculus, frames- scripts- knowledge acquisition techniques- factors to be considered while expert systems.

Unit – IV: Forward Chaining , Backward Chaining- Tools for developing an expert system – Explanation facilities- Meta Knowledge – fuzzy reasoning.

Unit -V: Building various expert systems- case study Dendral, Mycin etc. Introduction to various applications of A.I. Natural Language processing – Natural Language understanding – perception – Learning using neuralnets.

Books for Study:

1. Elaine Rich , Artificial Intelligence McGraw Hill International.
2. P.H.Winston - Artificial Intelligence, Addison wessley.
3. Fredrick Hayes Roth , Donald A Waterman and Doughlas B.Leant (editors) - Building Expert System - Addison wesley - 1983.

References:

1. N.J. Nilson – Spring verlag - Principles of AI - 1983.
2. David W.Rolston - Principles of AI & Expert Systems Developmenet - McGrawHill.
3. Donald A Waterman - A guide to expert systems.

Title of the Course/ Paper	Elective – I : Systems Software		
Part III	Fourth Year & Seventh Semester	Credit: 4	
Objective of the course	This course introduces the concepts of Systems Software		

Unit-I: Introduction – System Sotware – Components of System software Evolution by System software – Model of Computer System; Introduction to software processors.

Unit-II: 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-III: 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-IV: 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-V: 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.
2. Leland L. Beck – System Software, An Introduction to System Programming" – Addison-Wesley.

Reference:

1. M. Joseph. System Software. Firewall Media
2. System Software: An Introduction to systems programming by Leland Beck (Pearson)
3. System Software : Nityashri,(McGraw-Hill Education)

SEMESTER VIII

Title of the Course/ Paper	Unix and Shell Programming		
Part III	Fourth Year & Eighth Semester	Credit: 3	
Objective of the course	This course introduces the concepts of Unix and Shell Programming		

Unit I: INTRODUCTION: File and common commands – Shell – More about files - Directories – Unix system – Basics of file Directories and filenames - Permissions – Inodes – Directory hierarchy - Devices – the grep family – Other filters – the stream editor sed – the awk pattern scanning and processing language – files and good filters.

Unit II: CONCEPTS OF SHELL: Command line structure – Metacharacters – Creating new commands – Command arguments and parameters – program output as arguments – Shell variables – More on I/O redirection – loop in shell programs – Bundle – Setting shell attributes, Shift command line parameters - Exiting a command or the shell, evaluating arguments – Executing command without invoking a new process – Trapping exit codes – Conditional expressions.

Unit III: SHELL PROGRAMMING: Customizing the cal command, Functions of command, While and Until loops – Traps – Catching interrupts – Replacing a file – Overwrite – Zap – Pick command – News command – Get and Put tracking file changes.

Unit IV: FEATURES IN UNIX: Standard input and output – Program arguments – file access – A screen at a time printer – On bugs and debugging – Examples – Zap – pick – Interactive file comparison program – Accessing the environment – Unix system calls – Low level I/O, File system Directories and inodes, Processors, Signal and Interrupts.

Unit V: PROGRAM DEVELOPMENT AND DOCUMENT PREPARATION: Program development – Four function calculator – Variables and error recovery – Arbitrary variable

names, Built in functions, Compilation into a machine, Control flow and relational operators, Functions and procedures – Performance evaluation – Ms macro package – Troff level – Tbl and eqn preprocessors – Manual page – Other document preparation.

Book for Study:

1. Brian W. Kernighan, Rob Pike - The UNIX Programming Environment - Prentice Hall of India(1984).
2. Steven Earhart - The UNIX System for MSDOS Users - Galgotia book source P. Ltd. (1990).
3. Stefen Prata - Advanced UNIX – A Programmer Guide.

References:

1. Raymond, Eric S. *The art of Unix programming*. Addison-Wesley Professional, 2003.
2. Kochan, Stephen G., and Patrick Wood. *UNIX shell programming*. Sams Publishing, 2003.
3. Arthur, Lowell Jay. *UNIX shell programming*. John Wiley & Sons, Inc., 1986.

Title of the Course/ Paper	Distributed Databases		
Part III	Fourth Year & Eighth Semester	Credit: 4	
Objective of the course	To inculcate knowledge on database concepts		

Unit–I: Features of Distributed versus Centralized Databases – Why Distributed Databases – Distributed Database Management Systems (DDBMSs)- Review of Databases – Review of Computer Networks-Levels of Distribution Transparency- Reference Architecture for Distributed Databases – Types of Data Fragmentation – Distribution Transparency for read-only Applications – Distribution transparency for Update Applications – Distributed Database Access Primitives – Integrity Constraints in Distributed Databases - A Framework for Distributed Database Design – The Design of Database Fragmentation – The Allocation of Fragments.

Unit–II: Equivalence Transformations for Queries – Transforming Global Queries into Fragment Queries – Distributed Grouping and Aggregate Function Evaluation – Parametric Queries -Optimization of Access Strategies - A Framework for Query Optimization – Join Queries – General Queries. A Framework for Transaction Management – Supporting Atomicity of Distributed Transactions – Concurrency Control for Distributed Transactions – Architectural Aspects of Distributed Transactions

Unit–III: Foundations of Distributed Concurrency Control – Distributed Deadlocks – Concurrency Control Based on Timestamps – Optimistic Methods for Distributed Concurrency Control - Reliability – Basic Concepts Nonblocking Commitment Protocols – Reliability and Concurrency Control – Determining a Consistent View of the Network – Detection and Resolution of Inconsistency – Checkpoints and Cold Restart - Distributed Database Administration – Catalog Management in Distributed Databases – Authorization and Protection.

Unit–IV: Distributed object database management systems – Fundamental object concepts and Models – Object – Abstract Data Types – Composition (Aggregation) – Class – Collection – Subtyping and Inheritance. – Object Distribution Design – Horizontal Class Partitioning – Vertical Class Partitioning – Path Partitioning – Class Partitioning Algorithms – Allocation – Replication – Alternative Client / Server Architectures – Cache Consistency – Object Identifier Management – Pointer Swizzling Object Migration – Distributed Object Storage – Object Query Processor Architectures – Query Processing Issues – Query Execution – Correctness Criteria – Transaction Models and Object Structures – Transactions Management in Object DBMSs – Transactions as Objects – Conclusion – Bibliographic Notes – Exercises.

Unit–V: Parallel Database Systems – Database Server Approach – Database Servers and Distributed Databases – Parallel System Architectures – Objectives – Functional Aspects – Parallel Data Processing – Parallel Query Optimization – Data Placement – Query Parallelism – Parallel Execution Problems – Initialization – Interferences and Convoy Effect – Load Balancing – Parallel Execution for Hierarchical Architecture – Problem Formulation – Basic Concepts – Load Balancing Strategy – Performance Evaluation – Conclusion – Bibliographic Notes – Exercises

Books for Study:

1. Stefano Ceri, Giuseppe Pelagatti - Distributed Databases Principles &Systems- McGraw-Hill.
2. M.Tamer Ozsu, Patrick Valduriez - Distributed database systems- Prentice Hall-Second Edition.

Reference Book:

1. Özsu, M. Tamer, and Patrick Valduriez. *Principles of distributed database systems*. Springer Science & Business Media, 2011.
2. David, Bell, and Jane Grimson. "Distributed Database Systems." *Addison — Wesley* (1992).

Title of the Course/ Paper	E-Commerce		
Part III	Fourth Year & Eighth Semester	Credit: 3	
Objective of the course	This course gives an exposure to the Electronic Commerce		

Unit-I: Overview of electronic commerce: introduction-definition of electronic commerce-potential benefits of electronic commerce-internet and www as enablers of electronic commerce-impact of electronic commerce on business models-electronic commerce security-organization of topics-implications for the accounting. Electronic commerce and the role of independent third parties: introduction-consulting practices and accountants-independence-cpa vision problem-new assurance services identified by the aicpa-impact of Electronic commerce on the traditional assurance function-third party Assurance of web based electronic commerce-implications for the accounting. Regulatory environment: introduction-cryptography issues-privacy issues-web linking-domain name dispuits-internet sales tax-electronic agreement and digital signature – Internet service providers and international libel laws-implications for the accounting.

Unit-II: Edi electronic commerce and the internet: introduction-traditional Edi system-data transfer and standards-financial Edi-Edi systems and the internet-impact of Edi internet applications on the accounting profession. Risks of insecure system: introduction-overview of risks associated with internet transactions-internet associated risk- intranet associated risk-social

engineering-risks associated with business transactions- risks associated with confidentially maintained archival-Master file and reference data- risks associated with virus and malicious-implications of the accounting.Risks management: introduction- control weekness vs control risks – Risk management paradigm – disaster recovery plans- Implications of the accounting.

Unit-III: Internet security standards:-introductions- standard setting issues and Committiees - security committiees and organization - security protocols and languages-messaging protocols – secure electronic payments and protocols-the role of accountants in internet related standard setting process. Cryptography and authentication: introduction-message security issues-Encryption techniques-key management-additional authentication methods-additional non repudiation techniques- implications of the accounting .

Unit-IV: Firewalls: introduction – firewall defined – TCP/IP-open system interconnect (OSI)-components of firewall-typical functionality of firewalls- network topology-securing the firewall-factors to consider in firewall design – in-house solutions Vs commercial fire wall software-limitations of security prevention provided by firewall – Implications of the accounting. Introduction-the *set* protocol – magnetic strip cards-smart cards-electronic check-electronic cash-implications of the accounting.

Unit-V: Intelligent agent: introduction-definition of intelligent agent-capabilities of intelligent agent-level of agent sophistication-agent societies- intelligent agents and electronic commerce-online information Chain - limitations of agents- implications of the accounting. Web based marketing: introduction-the scope of marketing-business marketing and information technology-strategy congruence-the four ps applied to internet marketing – the fifth "P"personalization- in ternet marketing techniques-online adv. mechanisms –web site design issues- Intelligent agent and their impacts on marketing techniques- Implications of the accounting.

Books for Study:

1. Marilyn Greenstein, Todd M Feinman - Electronic Commerce - Tata McGraw Hill - 2000.
2. Kalakota & Whinston – Frontiers of Electronic Commerce – 5th Indian Reprint – Addison Wesley – 2000.

Reference book:

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

Title of the Course/ Paper	Information Security		
Part III	Fourth Year & Eighth Semester	Credit: 3	
Objective of the course	This course gives an exposure to security for information		

Unit 1: Introduction: Security- Attacks- Computer criminals- Method of defense Program Security: Secure programs- Non-malicious program errors- Viruses and other malicious code- Targeted malicious code- Controls against program threats.

Unit 2 : Operating System Security: Protected objects and methods of protection- Memory address protection- Control of access to general objects- File protection mechanism- Authentication: Authentication basics- Password- Challenge-response- Biometrics.

Unit 3 : Database Security: Security requirements- Reliability and integrity- Sensitive data- Interface- Multilevel database- Proposals for multilevel security.

Unit 4 : Security in Networks: Threats in networks- Network security control- Firewalls- Intrusion detection systems- Secure e-mail- Networks and cryptography- Example protocols: PEM- SSL- Ipsec.

Unit 5 : Administrating Security: Security planning- Risk analysis- Organizational security policies- Physical security - Legal- Privacy- and Ethical Issues in Computer Security - **P**rotecting programs and data- Information and law- Rights of employees and employers- Software failures- Computer crime- Privacy- Ethical issues in computer society- Case studies of ethics.

1. Recommended Texts

1. C. P. Pfleeger, and S. L. Pfleeger, Security in Computing, Pearson Education, 4th Edition, 2003

2. Matt Bishop, Computer Security: Art and Science, Pearson Education, 2003.
3. Eric Maiwald, Network Security : A Beginner's Guide, TMH, 1999

2. Reference Books

1. Stallings**,** Cryptography And Network Security: Principles and practice, 4th Edition, 2006
2. Kaufman, Perlman, Speciner, Network Security, Prentice Hall, 2nd Edition, 2003
3. Macro Pistoia, Java Network Security, Pearson Education, 2nd Edition, 1999
4. Whitman, Mattord, Principles of information security, Thomson, 2nd Edition, 2005

Title of the Course/ Paper	Practical – IX: Unix Lab		
Part III	Fourth Year & Eighth Semester	Credit: 3	
Objective of the course	This course gives training in Unix programming		

Students can refer the following book for further details.

Charles Crowley - Operating Systems (A Design Oriented Approach) - TMH - 1998.

1. Inter Process Communication (IPC) using Message Queues.
2. IPC using pipes.
3. Implementation of wait and signal using counting semaphores.
4. Implementation of wait and signal using binary semaphores.
5. Atomic Counter update problem.
6. Counting Semaphores at the user level using binary semaphores.
7. Signaling processes.
8. Deadlock detection (for processes passing messages)
9. Process Scheduling: FCFS
10. Process Scheduling: Least Frequently Used.
11. Process Scheduling: Round Robin.
12. Producer-Consumer problem with limited buffers.
13. Dining-Philosopher Problem.
14. Reader-Writer problem.
15. Two Process Mutual Exclusion.

Title of the Course/ Paper	Elective –II Software Project Management		
Part III	Fourth Year & Eighth Semester	Credit: 4	
Objective of the course	This course gives an exposure to Software Project Management		

Unit-I: Introduction to Software Project Management- Software project versus other types of project- problems- management control- Stakeholders- Requirement Specification – Information and control in organizations Introduction to step wise project planning- Select-identify scope and objectives- identify project infrastructure- Analyse project characteristics- products and activities- Estimate effort for each activity- Identify activity risks- Allocate resources- Review/ publicize plan- Execute plan and lower levels of planning. Project evaluation- Introduction – Strategic assessment- technical assessment- cost benefit analysis- cash flow forecasting- cost-benefit evaluation techniques- risk evaluation

Unit-II: Selection of an appropriate project approach- choosing technologies- technical plan contents list- choice of process models- structured methods-rapid application development-waterfall model- v-process model-spiral model- software prototyping- ways of categorizing prototypes- tools- incremental delivery- selecting process model - Software effort estimation-introduction- where-problems with over and under estimates- basis for software estimating-software effort estimation technique- expert judgement- Albercht function point analysis-Function points Mark II- Object points- procedural code oriented approach- COCOMO. Activity Planning- Objectives- Project schedules- projects and activities- sequencing and scheduling activities- network planning models- formulating a network model- using dummy activities- representing lagged activities- adding time dimension- forward pass- backward pass-identifying the critical path- Activity float- shortening project duration – identifying critical activities-precedence networks

Unit-III: Risk Management- nature of risk- managing- identification-analysis- reducing-evaluating- z values. Resource allocation- nature of resources- requirements-scheduling- critical paths- counting the cost-resource schedule- cost schedule- scheduling sequence. Monitoring and

control- creating the frame work- collecting the data- visualizing the progress- cost monitoring- earned value- prioritizing monitoring-Change control.

Unit-IV: Managing contracts- types of contract- stages in contract placement- terms of a contract-contract management- acceptance. Managing people and organizing teams- organizational behaviour background- selecting the right person for the job- instruction in the best methods-motivation- decision making-leadership-organizational structures. Software quality- importance- defining –ISO9126- practical measures- product versus process quality management- external standards-techniques to help enhance software quality

Unit-V: Small projects- some problems- content of a project plan. PRINCE 2- an overview- BS6079:1996- an overview - Euro method- an overview

Books for Study:

1. Bob Hughes and Mike Cotterell – Software project management-second edition- McGraw Hill.
2. Walker Royce - Software Project Management - Addison Wesley.

Reference Book:

1.Agarwal, Bharat Bhushan, and Sumit Prakash Tayal. *Software Project Management*. Laxmi Publications, 2011.

Title of the Course/ Paper	Elective II Fuzzy Logic		
Part III	Fourth Year & Eighth Semester	Credit: 4	
Objective of the course	This course gives an exposure to Fuzzy Logic concepts		

Unit-I: Introduction – Classical sets and Fuzzy Sets – Classical sets – fuzzy sets – sets as points in hyper cubes – classical relations and fuzzy relations – Cartesian product – crisp relations – fuzzy relations – tolerance and equivalence relations – fuzzy tolerance and equivalence relations – Value assignments.

Unit-II: Membership functions – Features of the membership functions – standard forms and boundaries – Fuzzification – Membership value assignments – Fuzzy to crisp conversions – Lambda cuts for fuzzy sets – Lambda cuts for fuzzy relations – Defuzzification methods – Fuzzy arithmetic, numbers, vectors and the extension principle – Extension principle – Fuzzy numbers – Interval Analysis in arithmetic – Approximate methods of extension – Fuzzy vectors.

Unit-III: Classical logic and fuzzy logic – Classical predicate logic – fuzzy logic – approximate reasoning – fuzzy tautologies, contradictions, equivalence and logical proofs – other forms of the implication operation – other forms of the composition operation – Fuzzy rule based system – natural language – linguistic hedges – rule based systems – graphical techniques of inference.

Unit- IV: Fuzzy nonlinear simulation – fuzzy relational equations – partitioning – nonlinear simulation using fuzzy rule based systems – fuzzy associative memories (FAMs) – Fuzzy decision making – fuzzy synthetic evaluation – fuzzy ordering – preference and consensus – multiobjective decision making - fuzzy Bayesian decision method – decision making under fuzzy states and fuzzy actions .

Unit-V: Fuzzy classification – classification by equivalence relations – cluster analysis – cluster validity – c-Means clustering – classification metric – hardening the fuzzy c-Partition – similarity relations from clustering – Fuzzy pattern recognition – feature analysis – partitions of

the feature space- single sample identification - multi feature pattern recognition – image processing – syntactic recognition.

Book for Study:

1. Timothy J Ross - Fuzzy Logic With Engineering Applications - McGraw Hill International Editions – Electrical Engineering Series.

REFERENCES

1. Fuzzy Sets, Uncertainty & Information by G.J.Klir& T.A. Folyger, PHI, 1988.
2. Fuzzy sets & Fuzzy logic by G.J.Klir&B.Yuan, PHI, 1995.
3. George J. Klir& Tina Folger A., "*Fuzzy sets Uncertainty & Information",* PHI Learning Pvt.Ltd,2010
4. Jang J.S.R. Sun C.T., Mizutani E., "*Neuro fuzzy and Soft Computing*", PHI Learning Pvt. Ltd., 2012

Title of the Course/ Paper	Elective –II Computer Simulation and System Modeling		
Part III	Fourth Year & Eighth Semester	Credit: 4	
Objective of the course	This course gives an exposure to Computer Simulation and System Modeling		

Unit-I: Introduction to Simulation: Advantages and Disadvantages of Simulation – Areas of Application – Systems and System Environment- Components of a System – Discrete and Continuous System – Model of a System – Types of Models – Discrete- Event System Simulation – Steps in a Simulation Study: Simulation Examples. Programming Languages for Simulation: FORTRAN, GPSS, SIMAN, SIMSCRIPT, SLAM and MODSIM III.

Unit-II: Statistical Models in Simulation: Useful Statistical Models- Discrete Distributions – Continuous Distributions-Poisson Process – Empirical Distributions. Simulation of Manufacturing and Material Handling Systems : Modeling of Manufacturing Systems- Models of Material Handling Systems – Goals and Performance measures- Issues in simulating

Manufacturing and Material Handling Systems- Simulators and Languages for Manufacturing and Material Handling Systems. Simulation of Queueing Systems: Queueing System Characteristics- Queueing Notation – Transient and Steady – State behavior of queues- Long-Run-Measures of Performance of Queuing Systems- Steady – State – Behavior of Infinite Population Markovian Models- Network of Queues.

Unit-III: Random Number Generation**:** Properties of Random Numbers- Generation of Pseudo Random Numbers- Techniques for Generating Random Numbers- Tests for Random Numbers. Random Variate Generation: Inverse Transformation Technique- Uniform Distribution – Exponential Distribution – Weibull Distribution- Triangular Distribution- Empirical Continous Distribution – Discrete Distribution – Direct Transformation for the Normal Distribution – Convolution Method for Erlang Distribution – Acceptance-Rejection Technique: Pisson Distribution- Gamma Distribution.

Unit-IV: Input Data Analysis : Data Collection – Identifying the Distribution with Data-Parameter Estimation-Goodness-of-Fit Tests:- Chi-Square Test- Kolmogrov- Smirnov Test; Selecting Input Models without Data – Multivariate and Time Series Input Models. Verification and Validation of Simulation Models**:** Model Building , Verification and Validation – Verification of Simulation Models- Calibration and Validation of Models:- Face Validity-Validation of Model Assumptions- Validating Input-Output Transformations- Input-Output Validation using a Turing Test.

Unit-V: Output Data Analysis : Stochastic Nature of Output Data – Types of Simulation with respect to output Analysis- Measures of Performance and their Estimation – Output Analysis for Terminating Simulations- Output Analysis for Steady-State Simulations. Comparison and Evaluation of Alternative System Designs: Comparison of Two System Designs – Comparison of Several System Designs – Statistical Models for Estimating the Effect of Design Alternatives – Metamodeling.

Books for Study:

1. Jerry Banks , John S.Carson, II and Barry L.Nelson - 'Discrete-Event System Simulation' - 2nd Edition. - Printice Hall - 1995.
2. Averill M. Law and W. David Kelton - Simulation Modeling and Analysis – TMH - 2000.

Reference Books

1. Geoffrey Gardon, 1992, System Simulation, 2nd Edn., Printice Hall of India.
2. Narsingh Deo, 1979, System Simulation with Digital Computers, Prentice Hall of India.
3. C.Dennis Pegden, Robert E.Shannon and Randall P.Sadowski, 1995, Introduction to Simulation using SIMAN, 2nd Edn., Tata McGraw-Hill.

SEMESTER IX

Title of the Course/ Paper	Network Programming		
Part III	Fifth Year & Ninth Semester	Credit: 3	
Objective of the course	This course gives an exposure to Network Programming		

Unit-I: Overview of ActiveX Scripting – Java Scripting- Stand-Alone Scripts- ActiveX Controls- Creating ActiveX Controls.

Unit-II: ActiveX Documents- ActiveX Document Architecture- Creating ActiveX Documents.

Unit-III: URL Monikers- Hyperlinking- Hyperlink Interface- Working with URL Monikers- Overview of ISAPI- ISAPI Extension- ISAPI Filter.

Unit-IV: Designing IIS Applications - Building IIS Applications- Building Data Driven DHTML Applications.

Unit-V: ActiveX Documents - Technology – Migration Wizard- Modifying Code- Launching and Testing Document- Testing the DLL- Domain Name System (DNS) –E-mail (SMTP)-World Wide Web (HTTP)-Simple- Network management protocol (SNMP)-File Transfer Protocol (FTP)-Network Security: Firewall-Encryption and Decryption

Books for Study:

1. John Paul Muller – Visual C++ 5 from the GroundUp- Tata McGraw Hill Edition – 1998 (For first three units)
2. Noel Jerke – Visual Basic 6 (The Complete Reference) – Tata McGraw Hill Edition – 1999(For fourth and fifth units)
3. Wendell Odom, ”Introduction to CISCO Networking Technologies”, Dorling
4. Kindersley Publishing Inc., and Pearson Education, Inc., 2006
5. Larry L. Peterson, Bruce S.Davie,”Computer Networks: A System Approach”,Third Edition, Morgan Kauffman Publishers Inc., 2003.Andrew .S. Tanenbum, “Computer Networks”, Fourth Edition, 2003
6. Andrew .S. Tanenbum, “Computer Networks”, Fourth Edition, 2003

REFERENCES

1. James F. Kuross, Keith W. Boss,”Computer Networking, A Top down Approach Featuring the internet”, Third Edition, Addison Wesley, may13 2004.
2. Jain S,” Data Communication and Networking”, BPB Publications .Second Edition.
3. Benhrom Frouzan, “Introduction to Data Communication”, Fourth edition

Title of the Course/ Paper	Software Testing		
Part III	Fifth Year & Ninth Semester	Credit: 3	
Objective of the course	This course gives an exposure to testing of softwares		

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- Testing web applications: Introduction – Sample application – Functional and usability issues – configuration and compatibility testing – Reliability and availability– Performance – Security testing – End – to – end transaction testing – Database testing – Post implementation testing-

1. Recommended Texts

(i) B. Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi.

(ii) K.V.KK. Prasad , 2005, Software Testing Tools, DreamTech. India, New Delhi.

(iii) R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi.

2. Reference Books

(i) I. Burnstein, 2003, Practical Software Testing, Springer International Edn.

(ii) E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.

3. Website, E-learning resources

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

Title of the Course/ Paper	Data Warehousing and Data Mining		
Part III	Fifth Year & Ninth Semester	Credit: 3	
Objective of the course	This course introduces the fundamental concepts of Data Warehousing and Data Mining		

Unit 1: Introduction: Data Mining tasks – Data Mining versus Knowledge Discovery in Data bases – Relational databases – Data warehouses – Transactional databases – Object oriented databases – Spatial databases – Temporal databases – Text and Multimedia databases – Heterogeneous databases - Mining Issues – Metrics – Social implications of Data mining.

Unit 2: Data Preprocessing: Why Preprocess the data – Data cleaning – Data Integration – Data Transformation – Data Reduction – Data Discretization.

Unit 3: Data Mining Techniques: Association Rule Mining – The apriori Algorithm – Multilevel Association Rules – Multidimensional Association Rules – Constraint Based Association Mining.

Unit 4: Classification and Prediction: Issues regarding Classification and Prediction – Decision Tree induction – Bayesian Classification – Back Propagation – Classification Methods – Prediction – Classifiers accuracy.

Unit 5 : Clustering Techniques: cluster Analysis – Clustering Methods – Hierarchical Methods – Density Based Methods – Outlier Analysis – Introduction to Advanced Topics: Web Mining , Spatial Mining and Temporal Mining- Web mining- introduction- web content mining – web structure mining-web usage mining.

1. Recommended Texts

(i) J. Han and M. Kamber , 2001, Data Mining: Concepts and Techniques, Morgan Kaufmann, .New Delhi.

(ii) Paulraj Ponnaiah, 2001, Data Warehousing Fundamentals, Wiley Publishers.

(iii) S.N. Sivananda and S. Sumathi, 2006, Data Mining, Thomsan Learning, Chennai.

2. Reference Books

(i) M. H.Dunham, 2003, Data Mining : Introductory and Advanced Topics , Pearson Education, Delhi.

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

(iii) Hand, David J., Heikki Mannila, and Padhraic Smyth. Principles of data mining. MIT press, 2001.

3. Website, E-learning resources

(i) http://www. academicpress.com

(ii) http://www.mkp.com

Title of the Course/ Paper	Practical–X-Network Programming Lab		
Part III	Fifth Year & Ninth Semester	Credit:	
Objective of the course	This course gives training in Network programming		

1. Working with Java Scripts.
2. Creating ActiveX Controls.
3. OLE Server.
4. OLE Container.
5. Working with URL Monikers.
6. Creating an ISAPI Extension.
7. Creating an ISAPI Filter.
8. Building IIS Application.
9. Data- Driven DHTML Application.
10. ActiveX Documents.

Title of the Course/ Paper	Elective –III: TCP/IP Networks		
Part III	Fifth Year & Ninth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of TCP/IP Networks		

Unit-I: TCP/IP layering- Link Layer- ethernet and IEEE – Trailer encapsulation- SLIP- Address Resolution Protocol- example- ARP cache- ARP packet format- ARP examples- proxy ARP- Internet control message protocol- Ping program- Trace route program- introduction – operation- LAN output- WAN output- IP source routing option.

Unit-II: IP routing- introduction- routing principles- ICMP host and network unreachable errors- ICMP redirect errors- ICMP router discovery messages- Dynamic routing protocols- Unix routing daemons- RIP : Routing Information protocol- OSPF- BGP- CIDR User datagram Protocol: - UDP header- UDP checksum- example- IP fragmentation- Determining the path MTU using Traceroute- Maximum UDP datagram size- ICMP Source Quench error- UDP server design – Broadcasting and multicasting- Internet Group Management Protocol- example

Unit-III: The domain name system- message format- Pointer queries- Resource records- Caching- TFTP: Trivial File Transfer Protocol- example – security- Bootstrap Protocol- BOOTP Packet format- Server design- Through a router- vendor specific information.

Transmission Control Protocol – TCP services- TCP header- TCP connection establishment and termination- Timeout of connection establishment- Maximum segment size- TCP half close- State Transition diagram- Reset segments- TCP server design. TCP Interactive dataflow- interactive input- delayed acknowledgements- Nagle algorithm- Window size advertisements - TCP Bulk data flow- Normal data flow- Sliding windows- window size – push flag- Slow start- Bulk Data throughput- Urgent mode.

Unit-IV: TCP timeout and retransmission- example- RTT example- congestion example- Fast retransmit and Fast recovery algorithms- ICMP errors- TCP persist timer- Silly window syndrome- TCP keep alive timer- example-TCP futures and performance-PAWS- T/TCP. SNMP- Simple Network Management Protocol- Object identifies- Instance Identification – Management Information Base – Additional Examples.

Unit V: Rlogin Protocol – Rlogin Examples – Telnet Protocol – Telnet Examples – File Transfer Protocol – FTP Examples – Simple Mail Transfer Protocol – SMTP Examples – SMTP Futures.- Application Protocols- File Transfer Protocol – Trivial File Transfer Protocol – Simple Mail Transfer Protocol- Simple Network Management Protocol – Hyper Text Transfer Protocol.

Books for Study:

1. W.Richard Stevens - TCP/IP - Illustrated Volume 1 - The Protocols –Addison Wesley.
2. Behrouz A.forouzan - TCP/IP – TMH.
3. Douglas E Comer,"Internetworking with TCP/IP Principles,Protocols and Architecture",Vol 1 and 2, Vth Edition

REFERENCES:

1. Forouzan, " TCP/IP Protocol Suite" Second Edition, Tate MC Graw Hill, 2003.

Title of the Course/ Paper	Elective – III: Artificial Neural Networks		
Part III	Fifth Year & Ninth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Artificial Neural Networks		

Unit I : Introduction to Neural Networks – Basic Concepts of Neural Networks – Inference and Learning – Classification Models – Association Models – Optimization Models – Self-Organization Models.

Unit II : Supervised and Unsupervised Learning – Statistical Learning – AI Learning – Neural Network Learning – Rule Based Neural Networks – Network Training – Network Revision- Issues- Theory of Revision- Decision Tree Based NN – Constraint Based NN.

Unit III : Incremental learning – Mathematical Modeling – Application of NN- Knowledge based Approaches.

Unit IV: Heuristics- Hierarchical Models – Hybrid Models – Parallel Models – Differentiation Models- Control Networks – Symbolic Methods- NN Methods.

Unit V: Structures and Sequences – Spatio-temporal NN – Learning Procedures – Knowledge based Approaches.

Books for Study:

1. Limin Fu - Neural Networks in Computer Intelligence – McGraw Hill International Edition – 1994.
2. Robert J Schalkoff – Artificial Neural Networks – McGraw Hill – 1997.

Reference Book:

1. Mehrotra, Kishan, Chilukuri K. Mohan, and Sanjay Ranka. *Elements of artificial neural networks*. MIT press, 1997.
2. Hassoun, Mohamad H. *Fundamentals of artificial neural networks*. MIT press, 1995.
3. Priddy, Kevin L., and Paul E. Keller. *Artificial neural networks: an introduction*.. SPIE press, 2005.

Title of the Course/ Paper	Elective- III: Windows Programming		
Part III	Fifth Year & Ninth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Windows Programming		

Unit-I : Windows Fundamentals – Programming Concepts and Vocabulary for Windows – Windows Development Tools – Resource Information.

Unit-II : Application Framework- Project Utility – Writing Windows Programming (Procedure Oriented) – Pie-chart Application.

Unit-III : MFC Library – MFC Design Considerations – Key features of MFC Library – C Object – Simple Application and Template- Drawing in Client Area- Fourier Series application with Resources- Bar Chart with Resources.

Unit-IV : Graph Applications – Word Processor Applications – OLE Features and Specifications - Container Application.

Unit-V: Active X Controls – Create simple Active X Controls with MFC – Customizing Controls – COM – DHTML- ATL vs. ActiveX.

Books for Study :

1. C.H.Pappas and W.H.Murray- Visual C++ 6 (The Complete Reference) Tata McGraw Hill Edition – 1999.
2. Lars Klander - Core Visual C++ 6 –Addison wesley- First Indian reprint – 2000.
3. Herbert Schildt – Windows 98 Programming from the GroundUp – Tata McGraw Hill Edition – 1999.

Title of the Course/ Paper	Elective –IV CAD/CAM		
Part III	Fifth Year & Ninth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of CAD/CAM		

Unit-I: Introduction-CAD/CAM Contents and Tools – History of CAD/CAM Development - CAD/CAM Market Trends – Definition of CAD/CAM Tools – Industrial Look at CAD/CAM – Book Approach – Book Organization. CAD/CAM Hardware – Introduction – Types of Systems - CAD/CAM Systems Evaluation Criteria – Input Devices – Output Devices – Hardware Integration and Networking – Hardware Trends.

Unit-II: CAD/CAM Software – Introduction – Graphics Standards – Basic Definitions – Modes of Graphics Operations – User Interface – Software Modules – Modeling and Viewing – Software Documentation – Software Development – Efficient Use of CAD/CAM Software – Software Trends. Microcomputer-Based CAD/CAM – Introduction – General Features – System Implementation – Hardware Components and Configuration – Micro-Based CAD Software – Customizing the Software – File Translation – Operating Systems – Mechanical Applications – MicroCAD Trends – Product Distribution Trends.

Unit-III: Types and Mathematical Representations of Curves – Introduction – WireFrame Models – WireFrame Entities – Curve Representation – Parametric Representations of Analytic Curves – Parametric Representation of Synthetic Curves – Curve Manipulations – Design and Engineering Applications.

Unit-IV: Types and Mathematical Representations of Surfaces – Introduction – Surface Models – Surface Entities - Surface Representation – Parametric Representation of Analytic Surfaces – Parametric Representation of Synthetic Surfaces – Surface Manipulations – Design and Engineering Applications. Types and Mathematical Representations of Solids – Introduction – Solid Models – Solid Entities – Solid Representation – Fundamentals of Solid Modeling – Half-spaces – Boundary Representation (B-rep) – Constructive Solid Geometry (CSG) – Sweep Representation – Analytic Solid Modeling (ASM).

Unit-V: CAD/CAM Data Exchange – Introduction – Evolution of Data Exchange Format – IGES – PDES. TWO AND THREE DIMENSIONAL GRAPHICS CONCEPTS: Geometric Transformations – Introduction – Transformations of Geometric Models – Mappings of Geometric Models – Inverse Transformations and Mappings – Projections of Geometric Models – Design and Engineering Applications.

Book for Study:

1. Ibrahim Zeid - CAD/CAM Theory and Practice - Tata McGraw-Hill Edition -2000.

Reference Book:

1. Bielefeld, Bert, and Isabella Skiba. *Basics technical drawing*. Birkhäuser, 2013.
2. Medland, A. J. *Principles of CAD: a coursebook.* Springer Science & Business Media, 2012.

Title of the Course/ Paper	Elective – IV: Distributed Computing		
Part III	Fifth Year & Ninth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Distributed Computing		

Unit-I: Hardware Concepts - Switched Multiprocessor - Bus-based multicomputers - Switched Multicomputers - Software concepts - Network Operating Systems and NFS - Time Distributed Systems. Design Issues: Transparency - Flexibility - Reliability - Performance and scalability.

Unit-II: Communications in distribute systems - The Client/Server Model - Blocking versus unbuffered primitives - Implementation of Client/Server model.

Unit-III: Synchronization in distributed systems - Clock synchronization - Mutual exclusion - Election algorithms - Atomic transactions - Dead lock distributed system - Threads - Thread usage and implementation of thread packages - Processor allocation.

Unit-IV: Distributed File System: File Service interface - Semantics of file sharing - Distributed file system - Implementation of new trends in distributed file system- Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering -Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols

Unit-V: Distributed databases: Distributed DBMS Architecture - Sorting Data in a Distributed DBMS - Distributed Catalog Management - Distributed query processing - Updating distributed data - Distributed transaction management - Distributed Concurrency control - Recovery.

Book for Study:

1. A.S. Tanenbaum - Modern Operating Systems - Prentice Hall.

2. Sunita Mahajan and Seema shah, "Distributed computing", Oxford, Second edition.
3. Andrew S. Tanenbaum & Maarten van steen, "Distributed systems: Principle and paradigms" , Prentice Hall of India Pvt. Ltd.

Reference Books

1. James Martin, " Computer Networks and Distributed Processing, Software Techniques and Architectures", Pearson Education.
2. Garg, Vijay K. *Elements of distributed computing*. John Wiley & Sons, 2002.
3. Garrido, José M., and Richard Schlesinger. *Principles of modern operating systems*. Jones & Bartlett Learning, 2008.

Title of the Course/ Paper	Elective – IV: Image Processing		
Part III	Fifth Year & Ninth Semester	Credit: 4	
Objective of the course	This course introduces the fundamental concepts of Image Processing		

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.

1. Recommended Texts

(i) R.C. Gonzalez, R.E.Woods, 2002, Digital Image processing, 2nd Edition, Pearson Education.

(ii) Anil K. Jain, 1994, Fundamentals of Digital image Processing, 2nd Edition, Prentice Hall of India, New Delhi.

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

2. Reference Books

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

3. Website, E-learning resources

(i) http://www.imageprocesssing place.com/DIP/dip-downloads

SEMESTER X

Title of the Course/ Paper	Project		
Part III	Fifth Year & Tenth Semester	Credit: 20	
Objective of the course	This course gives training in developing of new project		

Each student shall carry out an individual project for the full semester in an IT or related industry or in the department and a report of work done shall be submitted.

M.Sc. DEGREE COURSE IN COMPUTER SCIENCE AND TECHNOLOGY
(FIVE YEAR INTEGRATED COURSE)

CHANGES IN THE SYLLABUS

II Year & Fourth Semester
Title of the Course/ Paper: - Software Engineering

projects management, tools - analysis and design tools -programming tools - integration and testing tool - Case studies.

II Year & Fourth Semester
Title of the Course/ Paper: - Computer Graphics

Key Frame systems – General animation functions - morphing.

II Year & Fourth Semester
Title of the Course/ Paper: - Programming in C++

Introduction to C++: Principles of Object Oriented Programming - basic concepts and benefits of OOP - object oriented language - application of OOP

III Year & Fifth Semester
Title of the Course/ Paper: Database Management Systems

DBMS Models-The Hierarchical model-Network model-Relational model

III Year & Fifth Semester
Title of the Course/ Paper: Operating Systems

case study UNIX, Linux, windows 2000

III Year & Fifth Semester
Title of the Course/ Paper: VISUAL PROGRAMMING

Introduction to Windows, GUI concept, Concept of Event driven programming, Types of Visual Basic Projects, Visual Basic Editions, The Visual Basic Project Lifecycle, and Project Files

III Year & Fifth Semester
Title of the Course/ Paper: Computer Networks

PRESENTATION LAYER and APPLICATIONS

Presentation formatting – Data compression – Cryptographic Algorithms: RSA - DES — Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP.

BOOKS FOR STUDY

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

2. Andrew S. Tanenbaum, "Computer Networks", Tata Mcgraw Hill, 3rd Edition

III Year & Sixth Semester

Title of the Course/ Paper : **Computer Architecture**

PARALLEL ARCHITECTURES

Data flow - Vector processors - EPIC - Case Studies.

BOOK FOR STUDY:

1. D.A Patterson and J.L. Hennessy, Computer Architecture - A Quantitative Approach, Morgan Kaufmann Publishers, 2nd edition 1996

REFERENCES

1. Vincent P. Heuring, Harry F. Jordan Computer Systems Design and Architecture, Addison Wesley, 1999.

IV Year & Seventh Semester

Title of the Course/ Paper : Advanced Java Programming

Servlet and jsp programming – servlet life cycle – servlet API- HTML to servlet communication – introduction to JSP – JSP tags - sessions

IV Year & Seventh Semester

Title of the Course/ Paper : Design and Analysis of Algorithms

Important problem types- Fundamentals of the analysis of algorithm efficiency – analysis frame work –Mathematical analysis for non-recursivealgorithms.

V Year & nineth Semester

Title of the Course/ Paper : - Network Programming

Unit V:

Domain Name System (DNS) –E-mail (SMTP)-World Wide Web (HTTP)-Simple Network management protocol (SNMP)-File Transfer Protocol (FTP)-Network Security: Firewall-Encryption and Decryption.

BOOK FOR STUDY:

1. Wendell Odom, ”Introduction to CISCO Networking Technologies”, Dorling Kindersley Publishing Inc., and Pearson Education, Inc., 2006
2. Larry L. Peterson, Bruce S.Davie,”Computer Networks: A System Approach”, Third Edition, Morgan Kauffman Publishers Inc., 2003.

3. Andrew .S. Tanenbum, “Computer Networks”, Fourth Edition, 2003

REFERENCES

1. James F. Kuross, Keith W. Boss,”Computer Networking, A Top down Approach Featuring the internet”, Third Edition, Addison Wesley, may13 2004.

2. Jain S,” Data Communication and Networking”, BPB Publications .Second Edition.

Benhrom Frouzan, “Introduction to Data Communication”, Fourth edition

V Year & nineth Semester
Title of the Course/ Paper : - Software Testing

Testing web applications: Introduction – Sample application – Functional and usability issues – configuration and compatibility testing – Reliability and availability– Performance – Security testing – End – to – end transaction testing – Database testing – Post implementation testing.

V Year & nineth Semester
Title of the Course/ Paper : - Data Warehousing and Data Mining

Web mining- introduction- web content mining – web structure mining-web usage mining.

V Year & nineth Semester
Title of the Course/ Paper : - TCP/IP Networks

Unit V: APPLICATION PROTOCOLS

File Transfer Protocol – Trivial File Transfer Protocol – Simple Mail Transfer Protocol – Simple Network Management Protocol – Hyper Text Transfer Protocol.

V Year & nineth Semester
Title of the Course/ Paper : - DISTRIBUTED COMPUTING

Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering -Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols