DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

M.E. (FULL-TIME / PART-TIME) DEGREE PROGRAM IN COMPUTER SCIENCE AND ENGINEERING

CHOICE BASED CREDIT SYSTEM (CBCS)

REGULATIONS

R1. CONDITION FOR ADMISSION

Candidates for admission to M.E. Degree programme in Computer Science Engineering shall be required to have passed the B.E./B.Tech Computer Science and Engineering or B.E. / B.Tech Electrical and Electronics or B.E./B.Tech Electronics and Communication or B.E./B.Tech Electronics and Instrumentation or B.E./B.Tech Instrumentation and Control or B.E./B.Tech Information technology or Graduates of any other authority accepted by the syndicate of this University as equivalent thereto. They shall satisfy the conditions regarding qualifying marks, and physical fitness as may be prescribed from time to time by the syndicate of the Annamalai University. The candidates who underwent the degree programme under a Part-time scheme, should possess two years of professional experience after passing the B.E. degree examination. Admission to ME. (CSE) part time programme is restricted to those working within a radius of 75km from Annamalainagar.

R2. CREDITS

ME full-time programme will have a duration of four semesters. ME part-time programme will have a duration of six semesters.

The number of credits for each semester for the full-time programme shall be as follows:

First and second semesters	: 20 credits per semester
Third Semester	: 12 credits
Fourth Semester	: 13 credits

The number of credits for each semester of the part-time programme shall be as follows:

First to fourth semesters	: an average of 10 credits per semester
Fifth semester	: 12 credits
Sixth semester	: 13 credits

The total credits for both the programmes will be 65 each. For the award of the degree, a student has to earn a minimum of 65 credits.

R3. DURATION OF THE PROGRAMME

A student of the full-time programme is normally expected to complete in four semesters but in any case not more than four years from the time of admission.

A student of the part-time programme is normally expected to complete in six semesters but in any case not more than six years from the time of admission.

R4. REGISTRATION FOR COURSES

A student newly admitted will automatically be registered for all the courses prescribed for the first semester, without any option.

Every other student shall submit a completed registration form indicating the list of courses intended to be credited during the next semester. This registration will be done a week before the last working day of the current semester. Late registration with

the approval of the Dean on the recommendation of the Head of the Department along with a late fee will be done up to the last working day.

Registration for the thesis phase-I and phase-II shall be done at the appropriate semesters.

R5. ASSESSMENT

The break-up of assessment and examination marks for theory and practical subjects is as follows.

First assessment (I Mid Term Test)	: 15
Second assessment (II Mid Term Test)	: 15
Third assessment	: 10
Examination	: 60

The thesis phase-I will be assessed for 40 marks by a committee consisting of the Head of the Department, the guide and a minimum of two members nominated by the Head of the Department. The Head of the Department will be the chairman. 60 marks are allotted for the thesis work and viva voce examination at the end of the pre-final semester. The same procedure will be adopted in the final semester also.

R6. COUNSELLOR

To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a member of the faculty who shall function as counsellor throughout their period of study. Such counsellors shall advise the students, give preliminary approval for the courses to be taken by the students during each semester and obtain the final approval of the Head of the Department.

R7. CLASS COMMITTEE

For each semester, separate class committee will be constituted by the respective Heads of Departments.

The composition of the class committee for each semester except the final semester shall be as follows:

Teachers of the individual courses.

A project co-coordinator (in the pre-final and final semester committees only) who shall be appointed by the Head of the Department from among the project supervisors.

One professor or Reader, preferably not teaching the concerned class, appointed as chairman by the Head of the Department.

The Head of the Department may opt to be a member or the Chairman.

All counsellors of the class, the Head of the Department (if not already a member) and any staff member nominated by the Head of the Department may serve as special invitees.

The class committee shall meet four times during the semester.

The first meeting will be held within two weeks from the date of commencement of the class to decide the type of assessment like test, assignment etc. for the three assessments and the dates of completion of the assessments.

The second and third meetings will be held within a week after the completion of the first and second assessments respectively to review the performance and for follow-up action.

The fourth meeting will be held on completion of all the assessments except the end semester examination and at least one week before the commencement of the end semester examinations.

During this meeting the assessment on a maximum of 40 marks will be finalised for every student and tabulated and submitted to the Head of the Department for approval and transmission to the Controller of Examinations.

R8. WITHDRAWAL FROM A COURSE

A student can withdraw from a course at any time before a date fixed by the Head of the Department prior to the second assessment, with the approval of the Dean of the faculty on the recommendation of the Head of the Department.

R9. TEMPORARY BREAK OF STUDY

A student can take a one-time temporary break of study covering the current semester and/or the next semester with the approval of the Dean on the recommendation of the Head of the Department, not later than seven days after the completion of the second assessment test. However, the student must complete the entire programme within the maximum period of four years for full-time and six years for part-time.

R10. MOVEMENT TO THE PRE-FINAL SEMESTER

A minimum of 24 credits must be earned by the student to move to the pre-final semester. The results of the final semester will be withheld until the student passes all the previous semester examinations.

R11. SUBSTITUTE ASSESSMENTS

A student who has missed one or more of the assessments of a course other than the end semester examination, for genuine reasons accepted by the Head of the Department, may take a substitute assessment for any one of the missed assessments. The substitute assessment must be completed before the date of the fourth meeting of the respective class committee.

A student who wishes to have a substitute assessment must apply to the Head of the Department within a week from the date of the missed assessment.

R12. ATTENDANCE REQUIREMENTS

To be eligible to appear for the examination in a particular course, a student must put in a minimum of 80% of attendance in that course. However, if the attendance is 75% or above but less than 80% in any course, the authorities can permit the student to appear for the examination in that course on payment of the prescribed condonation fee.

A student who withdraws from or does not meet the minimum attendance requirement in a course must re-register for and repeat the course.

R13. PASSING & DECLARATION OF EXAMINATION RESULTS

All assessments of all the courses on an absolute marks basis will be considered and passed by the respective results passing boards in accordance with the rules of the University. The marks for each course shall be converted to the corresponding letter

grade as follows. Thereafter, computation of the Grade Point Average(GPA) and Cumulative Grade Point Average(CGPA) shall be done.

		Grade
90 to 100 marks	:	S
80 to 89 marks	:	A
70 to 79 marks	:	B
60 to 69 marks	:	C
55 to 59 marks	:	D
50 to 54 marks	:	E
Less than 50 marks	:	F
Insufficient attendance	:	I
Withdrawn from the course	:	W

In order to pass a course the student has to score 24 marks out of 60(end semester examination) and 50 marks out of 100(total marks).

A student who earns a grade of S, A, B, C, D or E for a course is declared to have successfully completed that course and earned the credits for that course. Such a course cannot be repeated by the student.

A student who obtains letter grades I or W in a course must reregister for and repeat the course.

A student who obtains letter grade F in a course has to reappear for the examination in that course.

A student who obtains letter grade I or W or F in thesis phase-I must reregister in the next semester. Registration for thesis phase-II for such students can be done in the subsequent semesters.

The following grade points are associated with each letter grade for calculating the GPA and CGPA.

S - 10; A - 9; B - 8; C - 7; D - 6; E - 5; F - 0

Courses with grades I and W are not considered for calculation of grade point average or cumulative grade point average. F grade will be considered for computing GPA and CGPA

A student can apply for re-totalling of one or more of his/her examination answer papers within a week from the date of issue of grade sheet to the student on payment of the prescribed fee per paper. The application must be made to the controller of examinations with the recommendation of the Head of the department.

After results are declared, grade cards will be issued to the students. The grade card will contain the list of courses registered during the semester, the grades scored and the grade point average for the semester.

GPA is the sum of the products of the number of credits of a course with the grade point scored in that course, taken over all the courses for the semester, divided by the sum of the number of credits for all courses taken in that semester. CGPA is similarly calculated considering all the courses taken from the time of admission.

The results of the final semester will be withheld until the student obtains passing grades in all the courses of all the earlier semesters.

After successful completion of the programme, the degree will be awarded with the following classifications based on CGPA.

For First class with Distinction the student must earn a minimum of 65 credits within four semesters for full-time and six semesters for part-time from the time of admission, pass all the courses in the first attempt and obtain a CGPA of 8.25 or above.

For First class, the student must earn a minimum of 65 credits within two years and six months for full time and three years and six months for part time from the time of admission and obtain a CGPA of 6.75 or above.

For second class the student must earn a minimum of 65 credits within four years for full-time and six years for part-time from the time of admission.

R14. RANKING OF CANDIDATES

The candidates who are eligible to get the M.E. degree in First Class with distinction will be ranked on the basis of CGPA for all the courses of study from I to IV Semester for M.E. Full time and from I to VI Semester for M.E. Part-Time.

The candidates passing with First class and without failing in any subject from the time of admission will be ranked next to those with distinction on the basis of CGPA for all the courses of study from I to IV Semester for M.E. Full time and from I to VI Semester for M.E. Part-Time.

R15. ELECTIVES

Apart from the various elective courses offered in the curriculum of the branch of specialisation, a student can choose a maximum of two electives from any specialisation under the faculty during the entire period of study, with the approval of the Head of the Department and the Head of the Department offering the course.

R16. TRANSITORY REGULATIONS

If a candidate studying under the old regulations could not attend any of the courses in his/her programme, shall be permitted to attend equal number of courses, under the new regulation and will be examined in those courses. The choice of courses will be decided by the concerned Head of the Department. However he/she will be permitted to submit the thesis as per the old regulations. The results of such candidates will be passed as per old regulations.

The University shall have powers to revise or change or amend the regulations, the scheme of examinations, the courses of study and the syllabi from time to time.

M.E. Degree Programme (Full time) in

Computer Science & Engineering

(Two year Degree Programme)

Choice Based Credit System (CBCS)

Subjects of study and scheme of examinations

FIRST SEMESTER

Code	Subject	L	Thesis	P	Exam Duration in hours	Exam marks	Sess. Marks	Total Marks	Credit points
CSEC101	Mathematical Structures of Computer Science	3	1		3	60	40	100	3
CSEC102	Data Structures and Algorithms	3	1		3	60	40	100	3
CSEC103	Computer Network Engineering &Management	3	1		3	60	40	100	3
CSEC104	Computer Graphics	3	1		3	60	40	100	3
CSEE105	Elective - I	2		2	3	60	40	100	3
CSEE106	Elective – II	2		2	3	60	40	100	3
CSEP107	Programming Lab[Data Structures & Graphics using C++]	-	-	3	3	60	40	100	2
Total		16	4	7		420	280	700	20

M.E. Degree Programme (Full time) in

Computer Science & Engineering

(Two year Degree Programme)

Choice Based Credit System (CBCS)

Subjects of study and scheme of examinations

SECOND SEMESTER

Code	Subject	L	Thesis	P	Exam Duration in hours	Exam marks	Sess. Marks	Total Marks	Credit points
CSEC201	Advanced Database Technology	3	1		3	60	40	100	3
CSEC202	Operating System Design	3	1		3	60	40	100	3
CSEC203	Software Engineering Methodologies	2		2	3	60	40	100	3
CSEC204	Elective - III	2		2	3	60	40	100	3
CSEE205	Elective - IV	2		2	3	60	40	100	3
CSEE206	Elective – V	2		2	3	60	40	100	3
CSEP207	Design Lab[Operating Systems & DBMS]	-	-	3	3	60	40	100	2
Total		14	2	11		420	280	700	20

M.E. Degree Programme (Full time) in
Computer Science & Engineering
(Two year Degree Programme)
Choice Based Credit System (CBCS)
Subjects of study and scheme of examinations

THIRD SEMESTER

Code	Subject	L	Thesis	Exam Duration in hours	Exam Marks	Sess. Marks	Total Marks	Credit points
CSEE301	Elective-VI	4		3	60	40	100	3
CSEE302	Elective-VII	4		3	60	40	100	3
CSET303	Thesis Phase-I & Viva-voce	-	15		60	40	100	6
Total		8	15		180	120	300	12

M.E. Degree Programme (Full time) in
Computer Science & Engineering
(Two year Degree Programme)
Choice Based Credit System (CBCS)
Subjects of study and scheme of examinations

FOURTH SEMESTER

Code	Subject	L	Thesis	Exam Duration in hours	Exam Marks	Sess. Marks	Total Marks	Credit points
CSET401	Thesis Phase-II & Viva-voce	-	-	-	60	40	100	13
Total		-	-	-	60	40	100	13

ELECTIVES

CSEE01. Knowledge Based Systems
CSEE02. Computer Architecture
CSEE03. Neural Networks and Fuzzy Systems
CSEE04. Digital Imaging
CSEE05. Object Oriented Systems Design
CSEE06. Real Time Computing Systems
CSEE07. Data Mining and Warehousing
CSEE08. Mobile Computing
CSEE09. VLSI Technology
CSEE10. Electronic Commerce Technology
CSEE11. Design and Analysis of Parallel Algorithms
CSEE12. Advanced System Software
CSEE13. Multimedia Systems
CSEE14. Advanced Web Design
CSEE15. Network Security
CSEE16. Internet Programming and Tools
CSEE17. Embedded Systems
CSEE18. Software Project Management
CSEE19. Embedded Controllers and Systems

CSEC101:MATHEMATICAL STRUCTURES OF COMPUTER SCIENCE

Mathematical reasoning – Propositions – Negation – Disjunction and conjunction – Implication – Equivalence – Quantifiers – Natural deduction – Rule of inference – Methods of proofs – Use in program proving – Brief outline of sets, relation, functions – Induction principle.

Finite state machines – State diagrams – State tables – Input and Output Moore and Mealy models – Equivalent histories – Equivalent states – Machine minimization – Finite state recognizers – Regular sets – Properties of regular sets – Regular expressions and Kleene's Theorem – Two way recognizers.

Grammars: Production systems – Chomskian hierarchy – Right linear grammars and finite state automata – Context-free grammars – Normal forms – Uvwxy theorem Parikh mapping – Selfembedding property – Subfamilies of CFL derivation trees and ambiguity.

Pushdown automata – Acceptance by empty store and final state – Equivalence to CFG – Parsing – CYK algorithm – Early's Algorithm – LR(k) and LL(k) grammars – Turing machine – Halting problem – Universal turing machine – Decidability – Post correspondence problem – Decidability of membership, emptiness and equivalence problems for languages.

Recursive functions & Lattices: Recursive functions – Primitive recursive functions – Computable and non-computable functions – Partial order relation – Poset – Lattices, Hasse diagram – Boolean algebra.

REFERENCES:

1. John E. Hopcroft and Jeffery D.Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, 1998.
2. W.K. Grassman and J.P.Trembley, "Logic and Discrete Mathematics", Prentice Hall, 1996.
3. Edgar G.Goodaire and Michael M.Parmenter, "Discrete Mathematics with Graph Theory", Prentice Hall, 1977.
4. D.F.Stanat and D.F. Mc.Allister, "Discrete Mathematics in Computer Science", Prentice Hall, 1977.
5. C.L. Liu, "Elements of Discrete Mathematics", McGraw Hill International Editions, 1985.
6. Tremblay & Manohar, "Discrete Mathematical Structures", 1997.

CSEC102: DATA STRUCTURES AND ALGORITHMS

INTRODUCTION

Mathematical Review – Basic concepts of Object oriented programming – C++ features – Recursion – Abstract data types – Algorithm analysis – NP completeness.

BASIC DATA STRUCTURES

List ADT – Implementation – Arrays, Cursors, Pointers – Stack and Queue ADT – Models – Implementation – Applications Trees – Traversals – Binary – Expression Search Tree ADT – AVL Trees – Splay and Binary trees.

SETS AND COMPUTER ALGORITHM

Set ADT – Basic Operations – Advanced Set representation – Priority Queue – Applications – Algorithms – Knapsack – traveling salesman – Graph coloring – 8Queens problems.

POLYNOMIALS AND MATRICES

Polynomials – Evaluation – Horner's Method – Matrices – Operations – Multiplication – Strassen's Method – Inversion – Solving systems of linear equations – Travelling salesman.

MEMORY MANAGEMENT

Issues – Storage allocation – Compaction – Garbage collection – Buddy Systems.

REFERENCES:

1. M.A. Weiss, "Data Structures and Algorithm Analysis in C++", Benjamin Cummings, 1994.
2. Aho, Hopcroft, Ullman, "Data Structures and Algorithms", Addison Wesley Publishing company, 1985.
3. Sara Baase, "Computer Algorithms: Introduction to Design and Analysis", Addison Wesley Publishing Company, 1988.
4. T.H.Corman, C.E. Leiserson & R.L.Rioest, "Introduction to Algorithms ", McGraw Hill company, 1994.
5. E. Horowitz and S.Sahini, "Fundamentals of Computer Algorithms", Galgotia Publications Pvt. Ltd., 1988.

CSEC103: COMPUTER NETWORK ENGINEERING AND MANAGEMENT

PROTOCOLS AND ARCHITECTURES

Protocols, Layered approach – OSI model – Hierarchical Approach – DOD model – SNA architecture – Local Network Technology – Bus / Tree topology – Ring topology – Medium access control protocols – Details of IEEE 802 standards – LAN protocol performance.

NETWORK ACCESS PROTOCOLS AND NETWORKING

Network interface – Circuit Switched Network Access – Packet Switched Network access – Broadcast Network access – Principles of internetworking - Bridges, Gateways – X. 75 – Internet protocol – ISO internet protocol standard – DOD internet protocol standard.

TRANSPORT AND SESSION SERVICE PROTOCOLS

Transport Services Protocol Mechanisms – Network Services – ISO Transport standards – DOD transport protocols – Session characteristics – ISO session service definition – ISO session protocol definition – Other session approaches.

PRESENTATION / APPLICATION PROTOCOLS

Virtual Terminal Protocols – File Transfer Protocols – Electronic Mail – Overview of ISDN – ISDN protocols.

NETWORK MANAGEMENT

Architecture of network Management protocols – Information extraction – Configuration Management – Fault management – Performance Management – Security Management – Accounting Management – Capacity planning – Standards.

REFERENCES:

1. Stallings, “Data and Computer Communications”, Maxwell and Macmillan, 1988.
2. Stallings, “Computer Communications: Architecture, Protocols and Standards”, IEEE Computer Society, 1987.
3. Andrew Tannenbaum S, “Computer Networks”, II Edition, Prentice Hall of India, 1988.
4. Ulyss Black, “Network Management Standards”, McGraw Hill, 1995.
5. Comer and Stevens, “Inter networking with TCP/IP Vol. III : Client server programming and application”, Prentice Hall, USA, 1998.

CSEC104: COMPUTER GRAPHICS

Introduction – Input and Output devices – Display processors – VGA card – Basic functions – Output primitives – Bresenham technique.

Two dimensional transformations – clipping – Segments – Display files – Interactive input methods – Logical classification of input devices.

Picture representation and construction techniques – Polygons – Splines – Fractals – Solid geometry methods – Octrees – Shape grammar – Surfaces – Hierarchical model for scene generation.

Three dimensional concepts – Transformations – Viewing – Clipping – Hidden surface and hidden line elimination algorithms.

Color models – Halftoning – Gouraud and Phone shading – Surface rendering – Ray tracing methods – texture – Animation – Morphing – Key frames method – Image file formats – Fundamentals of Image Processing.

REFEERENCES:

1. Hearn D and Baker M.P., “Computer Graphics”, Second Edition – PHI., NewDelhi – 1998.
2. Foley J.D., Van dam A., Feiner SK., Hughes JF., “Computer Graphics Principles and Practice”, Addison-Wesley Publishing Company, 1993.
3. Asthana RGS., Sinha NK., “Computer Graphics for scientists and Engineers”, Second Edition, New Age International Publishers, New Delhi, 1996.

CSEP107: PROGRAMMING LAB [DATA STRUCTURES AND GRAPHICS USING C++]

Exercises will be from Data Structures and Algorithms and Computer Graphics using C++ language.

CSEC201: ADVANCED DATABASE TECHNOLOGY

Introduction to databases – Entity – Relationship model, Hierarchical model – Network model – Relational model – Normalization – Relational commercial languages – Query processing – Crash recovery – Integrity and security – Storage structures – Indexing and hashing.

Distributed databases – An Overview – Principles of distributed databases – Management of distributed transactions – Concurrency control – Reliability – Client/Server databases – Parallel databases – Case studies using existing systems.

Object oriented databases – Introduction – Approaches to object oriented databases – Modeling and design for object oriented databases – Persistence – Transaction, concurrency, recovery and versioning in Object oriented databases.

Database connectivities need – 3GL connectivities – 4GL connectivities – Design of report writers – Triggers – Database administration.

Advanced databases – Intelligent, deductive, rule-based and temporal database systems – Knowledge bases – Spatial databases – Data mining.

REFERENCES:

1. Henry F.Korth and Abraham Silberschatz, "Database System Concepts", McGraw Hill International Editions, 1993.
2. Stefano Ceri & Giuesppe Pelagatti, "Distributed databases – Principles and Systems", McGraw Hill Book Company, 1987.
3. Setrag Khoshafian, "Object Oriented databases", John Wiley & Sons, Inc., 1993.
4. Jim Gray & Andress Rente, "Transaction Processing concepts & Techniques", Morgen Kauffman Publication, 1993.
5. Abdullah Uz tansel et al, "Temporal databases – Theory, Design and Implementation", The Benjamin/Cummings Publishing Co., Inc., 1993.
6. Joe Salemi, "Guide to Client/Sever Databases", BPB Publications, NewDelhi, 1994.
7. Michael L.Brodie & John Mylopoulos, "On knowledge Base management Systems – Integrating Artificial and Database Technologies", Springer Verlog, 1986.
8. Greogory, P., Shapiro & William J.Frawley, "Knowledge Discovery in Databases", AAAI/MIT Press, 1993.

CSEC202: OPERATING SYSTEM DESIGN

Introduction to Operating Systems – DESIGN TECHNIQUES I: Design Problems – Design Techniques –Interface Design – IMPLEMENTING PROCESSES: Implementation of a simple Operating System – Implementation of Processes – System call Interrupt Handling – Flow of control through the Operating System – Signaling, Interrupts in the Operating System - Operating Systems as Event and Table Managers – Process Implementation – PARALLEL SYSTEMS: Parallel Hardware – An Operating System for a two-processor system –A Multiprocessor Operating System– Threads –Implementation of Mutual Exclusion – Varieties of Computer Models.

INTER PROCESS COMMUNICATION PATTERNS: Problems when Processes compete – Race conditions and Atomic Actions – New message – Passing system calls – IPC Pattern – PROCESSES: Preemptive Scheduling Methods – Policy versus Mechanism in Scheduling –Scheduling in Real Operating Systems – Deadlock –Starvation – Synchronization – Semaphores – DESIGN TECHNIQUES II: Separation of concepts – Reducing a problem to a special case– Using models for Inspiration – Adding a new facility to a system.

MEMORY MANAGEMENT: levels of Memory management – Linking and Loading a process –Dynamic Memory allocation –Multiprogramming Issues – Memory Protection – Memory Management system calls – VIRTUAL MEMORY: Fragmentation and Compaction – Sharing the Processor and Sharing memory – Swapping – Overlays – Virtual Memory Management –VIRTUAL MEMORY SYSTEMS: Global page replacement algorithms – Thrashing and Load control– Segmentation – Sharing memory.

DESIGN TECHNIQUES III: Multiplexing – Late binding – Static versus Dynamic – Space-Time tradeoffs – Simple Analytic models – I/O DEVICES: Devices and Controllers – Terminal devices – Communication Devices – Disk Devices – Disk Controllers – SCSI Interfaces – Tape Devices – CD Devices – I/O SYSTEMS: I/O System software – Disk device Driver Access Strategies – Modeling of Disks – Device numbers – Unification of files and I/O Devices – Generalized Disk Device Drivers – Disk Caching – Two-Level Structure of Device drivers – SCSI Device Drivers.

FILE SYSTEMS: The Need for files – The File Abstraction – File Naming – File System Objects and Operations – File System Implementation – FILE SYSTEM ORGANIZATION: File System Organization – File Descriptors – How File Blocks are located on Disk - Review of File Storage Methods – Implementation of the Logical to Physical Block Mapping – File Sizes – Booting the Operating System – File System Optimization – File System Reliability – File Security and Protection – DESIGN TECHNIQUES IV: Caching – Optimization and Hints – Hierarchical Names – Naming of Objects – Unification of Concepts.

REFERENCES:

1. Charles Crowley, "Operating Systems - A Design Oriented Approach ", IRWIN, 1997.
2. Deitel, "An Introduction To Operating Systems", Addison Wesley Publishing co., 1985.
3. Milankovic M., "Operating System Concepts And Design", McGraw-Hill, Second Edition, 1992.
4. Madnick SE and Donovan JJ, "Operating System", McGraw-Hill, 1978.
5. Andrew S.Tannenbaum, "Operating Systems - Design & Implementation", Prentice Hall India, 1987.
6. Silberschatz Galvin ,"Operating System Concepts",Addison Wesley, Fifth Edition,1998.
7. Willam Stahlings,"Operating Systems", Prentice Hall,1997.

CSEC203: SOFTWARE ENGINEERING METHODOLOGIES

Software Engineering paradigms – Definitions – Life cycle model – Fourth generation techniques – Prototyping – Spiral model – Project management – Software metrices – Measuring software – Software estimation – Empirical estimation models – Planning – Risk analysis – Software project scheduling.

Structured analysis – Data flow diagrams – Extensions for real time system – Requirement dictionary – Software design – Abstraction – Modularity – Software Architecture – Effective modular design – Cohesion and Coupling – Architectural design and Procedural design – Data flow oriented design.

User interface design – Human factors – Human computer interaction – Human computer interface design – Interface standards – Programming languages and coding – Language classes – Code documentation – Code efficiency – Software Configuration Management – Software Reliability – Software testing – Path testing – Control Structures testing – Black box testing – Integration, Validation and system testing – Software Maintenance – Reverse Engineering and Re-engineering CASE tools – project management, tools – analysis and design tools – programming tools – integration and testing tools – Case studies.

QUALITY CONSIDERATIONS AND STANDARDS

Planning for Quality – Quality improvement teams – Quality recognition – ISO 9000, ISO 9001 standards.

QUALITY ASSURANCE

Software Quality and Software quality assurance – Software reviews – Software quality metrices – Formal approaches to Software quality assurance – Software reliability.

REFERENCES:

1. Roger Pressman S., “Software Engineering : A Practitioner’s Approach”, McGraw Hill, 1992.
2. Ian Sommer Ville, “Software Engineering”, Addison Wesley, 1996.
3. Michael G.Jenner, “Software Quality Management and ISO 9001 – How to make them work for you?”, John Willey & Sons Inc., 1995.
4. Tom Manns, Michael Coleman, “Software Quality Assurance” Mac-Millan Education Ltd., 1998.

CSEP207: DESIGN LAB [OPERATING SYSTEM & DBMS]

Exercises will be from Operating System Design and DataBase Management System.

ELECTIVES

CSEE01: KNOWLEDGE BASED SYSTEMS

Introduction to agents, Architecture of Agents, Motivating applications. Agents – Environments – OOPs and agents – Agents architecture – Agents with states – Concrete architecture – Logic based architecture – Entailment – Logic – Inference rules – Monotonicity – First order logic – Resolution – Modus ponens.

Multiagent systems & Agent societies – Logic based agent architecture – Reactive Architecture – Subsumption Architecture – Procedural and declarative representation – Belief Desire Intention Architecture – Components of BDI – Software Architecture: Layered Architecture. Multiagent systems – Communication languages : Overview – KQML (Knowledge Query and Manipulation Language) – KIF(Knowledge Interchange Format)

Distributed Problem solving & planning – Search algorithms – Distributed rational decision making – Probabilistic reasoning – Temporal issues.

Mobile agents of Implementing agent systems – Development environments – Programming Issues – Mobility & Security.

Applications: Information retrieval - E-Commerce -Telecommunication systems.

REFERENCES

1. Stuart J.Russel, Peter Noring, “AI – Modern Approach”, Prentice Hall, 1995.
2. Ed.Gerhard Wars, “MultiAgent systems”, MIT Press, 1995.
3. V.S.Subramanian, “Heterogeneous Agent – Formal Approach”, MIT Press, 2000.
4. Ellain Ritche, “Artificial Intelligence”, TMH
5. Neeran M. Karnik, Anand R. Tripathi, “Design Issues in Mobile Agent Programming Systems”.

Reference Links

http://www.ouhk.edu.hk/~operlink/current/0004/e-com.htm
http://www.computer.muni.cz/pubs/expert/1996/features/x10036/gei.htm
http://ai.bpa.arizona.edu/papers/mlir93/mlir93.html

Note: No prescribed book for the last unit. Materials are available in the net. Some of the relevant links are given above.

CSEE02: COMPUTER ARCHITECTURE

Introduction – Measuring & reporting Performance – Quantitative principles of computer design - Memory Hierarchy design – Cache, cache performance, reducing cache misses, reducing cache miss penalty, reducing hit time, Main memory, Virtual memory - Storage systems – Types, Buses, I/O performance measures - Designing an I/O system – Computer arithmetic – Basic Techniques of Integer arithmetic, Floating point arithmetic – Speeding up Integer arithmetic.

Instruction set principles – Classifying instruction set architectures, Memory addressing, Operations, Encoding an Instruction set, Role of compilers - DLX architecture – Pipelining – Basic pipeline for DLX, Pipeline Hazards, Data Hazards, Control hazards, Structured hazards, What makes pipelining hard to implement.

Advanced pipelines and Instruction level parallelism – Concepts and challenges – Dependencies – Data-name-control – Loop level parallelism – Overcoming data hazards with dynamic scheduling – scoreboard – Tomasulo approach – reducing branch penalties with dynamic hardware prediction – Branch target buffers – Taking advantage of more ILP with multiple issue – VLIW – complier support for ILP.

Multiprocessors – Shared – Memory Architecture, Synchronization, Memory consistency, Vector processors – Vector Architecture, Vector Length and stride, Compiler Vectorization, Enhancing Vector Performance.

RISC –Addressing modes of Instruction formats, MIPS, Power PC, RISC Vs CISC – Control Unit Operation – Micro operation, Micro programmed control – Microinstruction sequencing, TI8800, Applications of Microprogramming.

REFERENCES

1. D.A. Patterson and J.L.Hennessy, “Computer Architecture A Quantitative Approach”, Morgan Kaufmann Publishers, 1990.
2. J.M. Feldman & C.T. Retter, “Computer Architecture A Designer’s Text Based on a Generic RISC”, McGraw Hill, 1994.
3. “Benchmarks – Evaluating Supercomputers”, Aad Van der Steen, Chapman & Hall, 1990.
4. William Stallings, “Computer Organization and Architecture”, PHI, Fourth Edition, 1997.
5. V. Carl Hamacher, Zvokog G. Vranesic and Safwat G. Zaky, “Computer Organization”, McGraw Hill, ISE, 1984.

CSEE03 : NEURAL NETWORKS AND FUZZY SYSTEMS

Back Propagation

Introduction to Artificial Neural Systems – Perceptron – Representation – Linear separability – Learning – Training algorithm – The back propagation network – The generalized delta rule – Practical considerations – BPN applications.

Statistical Methods

Hopfield nets – Cauchy training – Simulated annealing – The Boltzmann machine, Associative memory – Bidirectional associative memory – Applications.

Counter Propagation Network & Adaptive Resonance Theory

CPN building blocks – CPN data processing, SOM data processing – Applications – ART network description – ART1 – ART2 – Application. The formal avalanche – Architecture of spatio temporal networks – The sequential competitive avalanche field – Applications of STNs.

Neo-Cognitron

Cognitron – Structure & training – The neocognitron architecture – Data processing – performance – Addition of lateral inhibition and feedback to the neocognitron. Optical neural networks – Holographic correlations.

Fuzzy Sets

Classical sets to Fuzzy sets – Fuzzy sets versus crisp sets – Operations on Fuzzy sets – Fuzzy arithmetic & Fuzzy relations – Fuzzy logic applications – Fuzzy systems – Pattern recognition – Fuzzy databases and Information retrieval systems.

REFERENCES

1. James Freeman A. and David Skapura M., "Neural Networks – Algorithms, Applications & Programming Techniques", Addison Wesley, 1992.
2. Yegnarayana B., "Artificial Neural Networks", Prentice Hall of India Private Ltd., New Delhi, 1999.
3. George J.Klir and Boyuvan, "Fuzzy sets and Fuzzy Logic – Theory and Applications", PHI, 1995.

CSEE04 : DIGITAL IMAGING

Digital Image Fundamentals

Image Transforms – Walsh, Hadamard, Discrete cosine, Hotellig Transforms, Image formation, File formats.

Image Enhancement

Histogram modification techniques – Image smoothening – Image Sharpening – Image Restoration – Degration model – Diagonalization of Circulant and block circulant matrices – Algebraic approach to restoration.

Image Compression & Segmentation

Compression models – Elements of information theory – Error free and lossy compression – Image segmentation – Detection of Discontinuities – Edge linking and boundary detection – Thresholding – Region Oriented Segmentations – Morphology.

Feature Extraction

Image feature description – Interpretation of Line drawings, Image pattern recognition algorithms.

Knowledge Representation And Use

Knowledge representations and use – Image analysis using knowledge about scenes – Image understanding using two dimensional methods.

REFERENCES

1. Gonzalez. R & Woods B.E., “Digital Image Processing”, Lind Ed., Addison Wesley, 1998.
2. Anil Jain.K, “Fundamentals of Digital Image Processing”, Prentice Hall of India, 1989.
3. Sid Ahmed., “Image Processing”, McGraw Hill, New York, 1995.

CSEE05: OBJECT ORIENTED SYSTEMS DESIGN

Object Oriented Systems Development – An introduction – Object Basics – OOA – OOD – OO Modelling - Object Oriented Systems development life cycle – Object Oriented Methodologies – Booch Methodology – Object Modelling technique – Jacobson et al Methodologies – UML.

Unified Modelling Language – Static and Dynamic Models – Need for Modelling – UML Diagrams – UML Class Diagrams – UML Object Diagrams – UML Interaction Diagrams – UML Sequence Diagram – UML Collaboration Diagram – UML State chart Diagram – UML Activity Diagram – UML Component Diagram- UML Deployment Diagram – Use case Diagrams.

Object Oriented Analysis – Identifying use cases – Object Analysis – Classifications Theory – Noun Phrase Approach – Common Class Patterns Approach – Use Case Driven Approach – Classes, Responsibilities and Collaborators – Identifying Object Relationships, attributes and methods.

Object Oriented Design Process – Object Oriented Design Axioms – Corollaries – Designing Classes – Designing Methods and Protocols – Access layer – Object store and persistence - Object Oriented Database Management Systems – Object Relational Systems – Multi database Systems – Designing access layer classes – View layer – Designing Interface Objects – Purpose of view layer Interface – Prototyping the user Interface.

Software Quality Assurance – Testing strategies – Impact of Object Orientation on testing – Test cases – Test plan – Debugging Principles – System Usability and Measuring user satisfaction – Object Oriented Design Metrics.

Case studies based on various Object Oriented Methodologies – Design of Foundation Class Libraries – Design of an Automated Teller Machine System – Modelling an Embedded System – Modelling a Client / Server System – Modelling a fully Distributed System.

REFERENCES

1. Ali Bahrami, “Object Oriented Systems Development”, Irwin McGraw Hill, International Edition, 1999.
2. Booch, “Object Oriented Analysis and Design with Applications”, II Edition, Benjamin Cummings, California, USA, 1994.
3. Coad, P. and Yourdon E., “Object Oriented Analysis”, II Edition, Englewood Cliff, NJ, Yourdon press, Prentice Hall, 1991.
4. Rumbaugh J.,Blaha M., Premerlani W., et al, “Object Oriented Modelling and Design”, Prentice Hall, Engle wood Cliff, NJ., 1991.
5. Jocobson I, Christerson M, Jonsson P and Ovesrgaard, “Object Oriented Software Engineering – A Use Case Driven Approach”, Addison Wesley, 1992.
6. Dennus de Champeaux et. al., “Object Oriented System Development”, Addison Wesley, 1993.
7. Fowler, “Analysis Patterns”, Addison Wesley, 1996.
8. Erich Gamna, “Design Patterns”, Addison Wesley, 1994.
9. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modelling Language User Guide”, Addison-Wesley, 1999.
10. Norman E.Fenton and Shari Lawerence Pfleegee, “Software Metrices – A Rigorous and Practical Approach”, Second Edition, ITP.

CSEE06: REAL TIME COMPUTING SYSTEMS

Introduction to Real-Time Systems(RTS): Typical examples of real-time systems – Characteristic features of real-time structural, functional and performance requirements of reactive real-time system – distinctive features from non-real-time and off-line systems.

Modelling RTS: Representation of time – concurrency and distributed ness in discrete event systems – examples of Modelling practical systems.

Analysis of RTS: Analyzing logical properties of discrete event systems – analyzing timing related properties. Examples of checking safety and timing properties of industrial systems.

Real Time Operating System :Multitasking – task management – task dispatch and scheduling – static and dynamic scheduling. Memory management – code sharing – input/output sub-system – task co-operation and communication. Concurrent programming – mutual exclusion – rendezvous.

Real-time programming: User requirement – language requirement – declaration – constants – control structure – modularity – exception handling – low-level and multitasking facilities. Introduction to Ada.

REFERENCES

1. C.M. Krishna, “Real-time Systems”, McGraw Hill, 1998.
2. Stuart Bennett, “Real-time Computer Control”, Prentice-Hall, 1988.
3. P.A. Laplante, “Real-time Systems Design and Analysis”, IEEE Press, 1992.
4. Lawrence, “Real-time Microcomputer Systems Design – An Introduction”, McGraw Hill, 1992.
5. S.H. Son, “Advances in Real-time Systems”, Prentice Hall of India, 1990.

CSEE07 : DATA MINING AND WAREHOUSING

Introduction

Relation to statistics, databases, machine learning – Taxonomy of data mining tasks – Steps in data mining process – Overview of data mining techniques.

Visualization and Statistical Perspectives

Visualization – Dimension reduction techniques – Data summarization methods – Statistical perspective – Probabilistic – Deterministic models – Clustering – Regression analysis – Time series analysis – Bayesian learning.

Predictive Modelling

Predictive Modelling – Classification – Decision trees – patterns – Association rules – Algorithms.

Data Warehousing

Design – Dimensional Modelling – Meta data – Performance issues and indexing – VLDB issues – Development life cycle – merits.

Applications

Tools – Applications – Case studies.

REFERENCES

1. Usama M.Fayyad, Gregory Piatetsky – Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, “Advances in Knowledge Discovery and Data Mining”, The M.I.T. Press, 1996.
2. Jiawei Han, Micheline Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers, 2000.
3. Ralph Kimball, “The Data Warehouse Life Cycle Toolkit”, John Wiley & Sons Inc., 1998.
4. Sean Kelly, “Data Warehousing in Action”, John Wiley & Sons Inc., 1997.

CSEE08 : MOBILE COMPUTING

Introduction

Medium access control – Telecommunication systems – Satellite systems – Broadcast systems.

Standards

Wireless LAN – IEEE 802.11 – HIPERLAN – Blue Tooth.

Adhoc Networks

Characteristics – Performance issues – Routing in mobile hosts.

Network Issues

Mobile IP – DHCP – Mobile transport layer – Indirect TCP – Snooping TCP – Mobile TCP – Transmission / time-out freezing – Selective retransmission – Transaction oriented TCP.

Application Issues

Wireless application protocol – Dynamic DNS – File systems – Synchronization protocol – Context – aware applications – Security – Analysis of existing wireless network.

REFERENCES

1. J.Schiller, "Mobile Communications", Addison Wesley, 2000.
2. http://www.bluetooth.com/
3. William C.Y.Lee, "Mobile Communication Design Fundamentals", John Wiley, 1993.

CSEE09. VLSI TECHNOLOGY

MOS Technology and Circuit Design

MOS Technology and VLSI - Process parameters and considerations for BJT - MOS and CMOS - Electrical properties of MOS circuits and Device Modelling – MOS Layers – Stick diagram – Layout diagram – Propagation delays – Examples of Combinational logic design – Sealing of MOS circuits.

Digital Circuits and Analog VLSI

Programmable Logic Array(PLA) and Finite State Machines – Design of ALUs – Memories and Registers – Introduction to Analog VLSI – Realization of Neural Networks and Switched capacitor filters – Sub-micron technology and GaAs VLSI technology.

Crystal Growth, Wafer Preparation, Epitaxy & Oxidation

Electronic Grade Silicon – Czochralski Crystal Growing – Silicon shaping – Processing consideration – Vapor Phase Epitaxy – Molecular Beam Epitaxy – Silicon on Insulators – Epitaxial Evaluation – growth Mechanism and Kinetics – Thin Oxides – Oxidation Techniques and Systems – Oxide properties – Redistribution of Dopants at Interface – Oxidation of Poly Silicon – Oxidation Induced Defects.

Lithography and Relative Plasma Etching

Optical Lithography – Electron Lithography – X-ray Lithography – Ion Lithography – Plasma properties – Feature Size control and Anisotropic Etch Mechanism – Relative Plasma Etching techniques and Equipments.

Deposition, Diffusion, Ion Implantation and Metalisation

Deposition Processes – Polisilicon – Plasma Assited Deposition – Models of Diffusion in Solids – Flick's One Dimensional Diffusion Equation – Atomic Diffusion Mechanism – Measurement Techniques – Range Theory – Implantation Equipment - Annealing Shalloe Junction – High Energy Implantation – Physical Vapor Deposition – Patterning.

REFERENCES

1. Douglas A. Pucknell and Kamran Eshraghian, "Basic VLSI Design Systems and Circuits", Prentice Hall of India Pvt. Ltd., 1993.
2. Wayne Wolf, "Modern VLSI Design", 2nd Edition, Prentice Hall, 1998.
3. Amar Mukherjee, "Introduction to NMOS and CMOS VLSI System Design", Prentice Hall, 1986.
4. Randall L.Geiger and P.E. Allen, "VLSI Design Techniques for Analog and Digital Circuits", McGraw Hill International Company, 1990.
5. Fabricious E, "Introduction to VLSI Design", McGraw Hill, 1990.
6. Mohammed Ismail and Terri Fiez, "Analog VLSI Signal and Information Processing", McGraw Hill, 1994.
7. S.M. Sze, "VLSI Technology", McGraw Hill, 2nd Edition, International Edition, 1998, Electrical and Electronic Engineering Series 1988.

CSEE10 : ELECTRONIC COMMERCE TECHNOLOGY

Introduction

Infrastructure for Electronic Commerce – Networks – Packet Switched Networks – TCP/IP – Domain name Services – Web Service Protocols – Internet applications – Utility programs – Mark up languages – Web Servers – Intranets and Extranets – Virtual private Network.

Core Technology

Electronic Commerce Models – Shopping Cart Technology – Data Mining – Intelligent Agents – Internet Marketing – XML and E-Commerce.

Electronic Payment Systems

Real world Payment Systems – Electronic Funds Transfer – Digital Payment – Internet Payment Systems – Micro Payments – Credit card Transactions – Case Studies.

Security

Threats to Network Security – Public Key Cryptography – Secured Sockets Layer – Secure Electronic Transaction – Network Security Solutions – Firewalls.

Inter/Intra Organizational Electronic Commerce

EDI-EDI application in business – Legal, Security and Privacy issues – EDI and Electronic commerce – Standard – Internal Information Systems – Macro forces – Internal commerce – Workflow Automation and Coordination – Customization and Internal commerce – Supply chain Management.

REFERENCES

1. Ravi Kalakota and Andrew B Whinston, “Frontiers of Electronic Commerce”, Addison Wesley, 1996.
2. Pete Loshin, Paul A Murphy, “Electronic Commerce”, II Edition, Jaico Publishers, 1996.
3. David Whiteley, “E-Commerce : Strategy, Technologies and Applications”, McGraw Hill, 2000.

CSEE11: DESIGN AND ANALYSIS OF PARALLEL ALGORITHMS

Introduction – Models of Parallel computation: A model of serial computation – Processor Organizations – Processor Arrays – Multiprocessors and multi computers – Parallel computing Terminology – Amdahl's law.

Designing Parallel Algorithms – General concepts – Processor arrays – MIMD Algorithms – Communication on MIMD models – Deadlock – Task Scheduling on MIMD systems – Simple PRAM Algorithms: Fan-In Technique.

Sorting and Fast Fourier Transform: Bitonic merge – Sorting on Processor arrays – Quick sort in Multiprocessor – Fast Fourier Transform – Dictionary Operations: Complexity of Parallel search – Ellis Algorithm.

Matrix multiplication: Processor array algorithms – Multiprocessor algorithms – Graph algorithms: Terminology – Algorithms for Processor arrays – Algorithms for multiprocessors.

Combinational Search: Divide and Conquer – Branch and Bound – Alpha Beta search – Logic programming: Introduction to Parallelism – Overview of parallelism in PROLOG – Pipelined Vector processors – Cray–1, Architectural Overview.

REFERENCES

1. Michael J.Quinn, "Designing Efficient Algorithms for Parallel Computers", University of New Hampshire, McGraw Hill Book Company.
2. Sara Baase and Allen Van Gelder, "Computer Algorithms", Addison Wesley.

CSEE12. ADVANCED SYSTEM SOFTWARE

Introduction

Introduction to System Software – Assemblers – Features and Functions – Loaders – Features and Functions – Macro processors – Features and Functions.

Compilers

Parts of a Compiler – Compiler construction Tools – Lexical Analyzer – Role of a Lexical analyzer – Specification and recognition of tokens – Finite automata – Regular expression to finite automaton – Use of a tool for generating lexical analyzer.

Syntax Analyzer

Role of a parser – Context-free grammars – Top-down parsing – Bottom-up parsing – Use of a tool to generate parsers.

Intermediate Code Generation

Intermediate languages – Declaration – Assignment statements – Boolean expressions – Flow control statements – Back patching.

Code Generation

Introduction to optimization techniques – Issues in the design of a code generator – Run-time storage management – Design of a simple code generator.

REFERENCES

1. A.V.Aho, Ravi Sethi, J.D. Ullman, “Compilers – Principles, Techniques and Tools”, Addison Wesley Publishing Company, 1988.
2. Allen I.Holub, “Compiler Design in C”, Prentice Hall of India, 1993.
3. Fischer Leblanc, “Crafting Compiler”, Benjamin Cummings, Menlo Park, 1988.
4. Leland Beck, “An Introduction to System Software”, Addison-Wesley.

CSEE13: MULTIMEDIA SYSTEMS

Introduction

Multimedia applications – System architecture – Objects of Multimedia systems – Multimedia databases.

Compression And File Formats

Types of compression – Image compression – CCITT – JPEG – Video image compression – MPEG – DVI Technology – Audio compression – RTF format – TIFF file format – RIFF file format – MIDI – JPEG DIG – TWAIN.

Input/Output Technologies

Traditional devices – Pen input – Video display systems – Scanners – Digital audio – Video images and animation.

Storage and Retrieval

Magnetic Media – RAID – Optical media – CD ROM – WORM – Juke box – Cache management .

Application Design

Application classes – Types of systems – Virtual reality design – Components – Databases – Authoring systems – Hypermedia – User interface design – Display/Playback issues – Hypermedia linking and embedding – Overview of multimedia software.

REFERENCES

1. Andleigh PK and Thakrar K, “Multimedia Systems Design”, Prentice Hall, 1996.
2. Vaughan T, “Multimedia”, Tata McGraw Hill, 1999.
3. Koegel Buford JFK, “Multimedia Systems”, Addison Wesley Longman, 1999.
4. Mark J.B., Sandara K.M., “Multimedia Applications Development using DVI Technology”, McGraw Hill, 1992.

CSEE14: ADVANCED WEB DESIGN

Fundamentals

Introduction to the Web – Web enabling Technologies – Web service protocol – Web Design concepts – Examining good and bad web design – Page Design Resources.

Simple Design Issues

Page Design – HTML – Web page style considerations – Page composition – Type faces – Tag parameters – Color and graphics for Web pages – WYSIWYG web page editor – Dream weaver.

Advance Design Issued

Advanced Page design – tables and frames – preparing graphics and animations - forms – cascading style sheets – user interface design – page grid – page templates – usability testing.

Scripting in Design

Typography and Graphic design for the Web – Creating transparent GIF – Lean graphics – Image maps – Palette map – Web Programming – Website garage – W3C HTML validation services – Net mechanic – DHTML – XML.

Tools and Applications

Online applications – Developing as on-line shopping application – Data Base design issues – connecting Data Base with tools such as Java, ASP, Cold Fusion – Designing Portals and Vortals.

REFERENCES

1. Deitel and Deitel, “Internet and World Wide Web how to program”, Prentice Hall, 2000.
2. Bob Breed love, “Web Programming Unleashed”, Sams Net Publications, 1996.
3. “DHTML”, ‘O’ Reiley Publications, 2000.

CSEE15: NETWORK SECURITY

Security Problem

Security problem in computing - Characteristics of computers in intrusion - Kinds of security breaches - Points of security vulnerability - Methods of defence - Controls - Effectiveness of controls - Plan of attack encryption.

Cryptography

Basic encryption and decryption - Mono alphabetic ciphers – poly alphabetic substitution, transpositions - Fractional Morse - Stream and block ciphers - Characteristics of good ciphers - Secure encryption systems - Public key systems - Single Key system - Data encryption standard - Rivest Shamir Adelman (RSA) encryption .

Role of Operating System

Security involving programs and Operating Systems - Information access problems - Program development controls - Operating system controls in use of programs administration controls - Protection services for users of operating system - Protected objects and method of protection - File protection mechanism - User authentication .

Database and Network Security

Database and Network security - Security requirements for database - Reliability and integrity - Sensitive data - Inference problem - Multilevel databases.

Network security issues - Encryption in networking - Access control - User authentication - Local Area Networks - Multilevel security of network .

Communication and System Security

Communication and system security - Communication characteristics - Communication media - Loss of integrity - Wire tapping - Electronic mail security - IP security - WEB security - Intruders, Viruses, Worms-Firewalls-Standards .

REFERENCES

1. William Stallings, “Cryptography and Network Security: Principles and Practice”, PHI, 1998.
2. Charles. P. Pleeger, “Security in Computing”, PHI, 1989.
3. Hans, “Information and Communication Security”, Springer Verlag, 1998.
4. Simonds, “Network Security”, McGraw Hill, 1998 .
5. Derek Atkins, “Internet Security”, Techmedia, 1998 .
6. Kernel Texplan, “Communication Network Management”, PHI, 1992 .
7. BAXER, "Networking Security", McGraw Hill, 1996.

CSEE16: INTERNET PROGRAMMING AND TOOLS

Basic Internet Concepts

History of Internet – RFCs, FYLs and STDs – Security – Protocols – Internet Addressing – DNS and Directory Services.

Internet Applications

Electronic Mail, Newsgroups, UUCP, FTP, Telnet, Finger, etc.

World Wide Web

Overview – Hyper Text Mark up Language – Uniform Resource Locators – HTTP Protocol – Common Gateway Interface – Multipurpose Internet Mail Extension – Web Browsers such as Netscape, Internet Explorer.

Java Programming Language

History – Language Features – Classes, Object and Methods – Sub classing and Dynamic Binding – Packages – Exceptions – Multithreading – JVM and Security – Overview of Class Library: I/O, AWT and NET – JDBC, Object Serialization – Remote Method Invocation – Java script – Java Vs C++.

Miscellaneous Topics

Intranets – Internet Commerce – Internet and VRML – Active X.

REFERENCES

1. April Marine, Susan Kirkpatrick, Vivian Neou and Carol Ward, "Internet: Getting Started", PTR Prentice Hall, 1994.
2. Ed Krol, "The Whole Internet: User's Guide and Catalog", O'Reilly & Associates, Inc., 1992.
3. William E. Weinman, "The CGT Book", New Riders, 1996.
4. Deitel and Deitel, "Java: How to Program", Prentice Hall, 1997.
5. Gary Cornell and Cay S.Horstmann, "Core Java" II Edition, Sunsoft Press, 1997.
6. Ted Coombs, Jason Coombs and Don Brewer, "Active X Source Book", John Wiley & Sons, 1996.

CSEE17: EMBEDDED SYSTEMS

Introduction: Overview of dedicated and automated systems – their specific requirements – robust design – environmental issues – temporal constraints – technological constraints – software systems – product design cycle.

Development of a System Specification: Evaluation – justification of the available levels of system integration (custom chip design through turnkey – systems) – technological choice.

Software Issues: Development environment compilers – linkers – debuggers – emulators – real time operating systems – kernels – Designing and implementing code for dedicated systems.

Hardware Issues: Choice of processor – I/O – memory – speed – integration – development facilities – economics – DSP devices.

Transducers: Sensors for measuring physical phenomena – output devices such as power actuators - motors. Data transformation – signal conditioning - data conversion. The impact of EMC regulations on design practice.

TEXT BOOK

1. Heath S. “Embedded Systems Design”, Butterworth – Heinemann 1997.

REFERENCE BOOK

1. Kirk Zurell – “C Programming for Embedded Systems” R & D Books-2000
2. David. E, Simon, "An embedded software primer", Pearson Education Asia – Addison Wesley Longman (Singapore), Low Priced Edition, 2001, ISBN – 81 – 7808 – 045 –1.
3. Michael Barr, “Programming Embedded Systems in C and C++”, Shroff Publishers & Distributors Pvt. Ltd. Calcutta., March 2001, ISBN- 81 – 7366 – 076 – X.

CSEE18: SOFTWARE PROJECT MANAGEMENT

Introduction: Defining a software development process - identify the software model, Activities, Relationship among Activities - document Information on each Activity, Tailoring, improving the process. Discipline - Need for - Implementing discipline - Attributes of successful leader. Communicating in Harmony - personality Traits, Management Tools.

Project Schedule Planning: Top-Down and Bottom-up planning - Initial and final project schedule plans - Types of Activity Relationships - Estimating the duration of an Activity - critical path - Identifying milestones - Activity responsibility matrix - project check list.

Project Tracking: Overview of project progress - project outlook - occurrence of tracking - tracking meetings - Tracking Meeting ground rules - Recovery plans - the role of Escalations.

Product Requirement and Specifications: product Requirements - understanding the customer's problem to solve - product objectives - providing direction for the solution - product specifications - Defining the Final product - Development testing - Unit test - function test - function test plan - Anticipating qualities weak link.

Marketing Issues: Vendor Relationships - The vendor contract process - Defining the vendors work - performance Incentives - A trackable plan - Measure performance Routinely - Quality system - proximity to Main Location - Acceptance of Deliverables is shipped product - Non preferential treatment - selecting, replacing a vendor – legal considerations - subcontractors - post project Review - product certification Reviews.

REFERENCE BOOKS

1. Neal Whitten : "Managing software Development projects", Formula for success, John Wiley and sons, Inc., 1995.
2. Watts Humphrey, "Managing the software process", Addison Wesley, 1989.

CSEE19: EMBEDDED CONTROLLERS AND SYSTEMS

INTRODUCTION:

Overview of dedicated and automated systems and their applications-Their specific requirements-Temporal and Technological constraints-software embedded in to a system-embedded systems on a chip(SOC) and the use of VLSI designed circuits-choice of a processor-product design cycle.

SOFTWARE ISSUES AND DEVELOPMENT:

Development environment compilers-linker/locator-getting embedded software in to the target system-emulation and debugging techniques-Real Time Operating systems-kernel-concepts of programming in assembly language (Vs) high level language-creating software state machines-designing and implementing code for dedicated systems.

HARDWARE ISSUES:

I/O devices-CAN bus and advanced I/O serial high speed buses-memory-speed-integration-embedded DSP devices-overview of embedded microcontrollers-introduction to FPGA-case study of a embedded system for a smart card and burglar alarm.

TRANSDUCERS:

Sensors for measuring physical phenomena-output devices such as power actuators-motors-data transformation-signal conditioning-data conversion-the impact of EMC regulations on design practice.

INTERFACING:

Parallel port interfaces-input switches and keyboards, output LED-Memory interfacing-address decoding ,general memory bus timing, external bus timing-general approach for high speed interfacing and analog interfacing-need for speed.

REFERENCES:

1. Heath S., “Embedded Systems Design”, Butterworth-Heinmann,1997.
2. Jonathan W.Valvano, “Embedded Mmicrocomputer Systems-Real time interfacing”, Brooks/cole, Thomson Asia Pvt ltd,2001.
3. David E.Simon, “An Embedded software Primer”, Pearson Education Asia, Addison Wesley longman, low price edition,2001.
4. Raj kamal, “Embedded Systems-Architecture Programming and Design”, Tata McGraw Hill,2003.
5. A.K.Sawhney, “Electrical & Electronics Measurement and Instrumentation”, Dhanpat Rai & co.pvt ltd,1997.