

Third Year Computer Engineering

Semester V

- 5.1 Economics And Management
- 5.2 Automata Languages And Computation
- 5.3 Microprocessors
- 5.4 Data Base Management Systems
- 5.5 Operating Systems
- 5.6 Computer Hardware Design

Semester VI

- 6.1 Operations Research
 - 6.2 Object Oriented Design And Programming
 - 6.3 Artificial Intelligence
 - 6.4 Computer Graphics
 - 6.5 Device Interfacing And PC Maintenance-I
 - 6.6 Computer Networks – I
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CE 5.1 ECONOMICS AND MANAGEMENT

MODULE 1

Introduction to subject, Demand analysis: Determinants, Demand curve, Elasticities, Sales/Demand forecasting techniques, Law of supply.

Cost and production analysis, Types of costs.

MODULE 2

Price and output decisions: Market structures, Price/output decisions in different markets, Economies, Diseconomies of scale. Factors of production, Isoquant, Isocosts.

Profit management: Contribution, Break even analysis, Types of revenue.

Business decision making: Advertising, Product life cycle, SWOT Analysis, BCG – Matrix.

MODULE 3

Managerial Effectiveness: Planning, Organizing, Line & Staff functions, Delegation, Leadership, Managerial grid, Motivation, Theory X, Theory Y, Communication, SBU, Span of Control

MIS: Characteristics, Applications in different functions – Controlling, Planning etc.

MODULE 4

Total Quality Management: Pyramid model of TQM, Objectives, Core concepts.

Marketing Planning, Tasks of marketing, Implementation and control.

TEXT BOOKS

1. Managerial Economics - By R. L. Varshan And K. L. Maheshwari, S. Chand
2. Industrial Management And Managerial Economics - By P. K. Gupta And P. B. Sharma, Ratnasagar Pvt. Ltd
3. Essentials of Management – By H. Koontz and H. Weihrich, Tata McGraw Hill

REFERENCE BOOKS

1. Economics – By Samuelson, McGraw Hill
2. Managerial Economics – By Peterson and Lewis, Prentice Hall.
3. Management – By Stoner, Freeman and Gilbert, Prentice Hall.
4. Engineering Management – By Fraidoon Mazda, Addison-Wesley
5. Marketing – By Philip Kotler, Prentice Hall.
6. Management Information System – By Jawadekar, Tata McGraw Hill
7. Management Information System – By Laudon and Laudon, Prentice Hall
8. Organizational Behavior – By Newstorm and Davis, Tata McGraw Hill

CE 5.2 AUTOMATA LANGUAGES AND COMPUTATION

MODULE 1

Introduction: Preliminaries, Mathematical induction and recursive definitions.

Finite Automata: Deterministic and Non Deterministic

Regular expressions. Two-way Finite Automata, Applications of finite automata

MODULE 2

Properties of regular sets: Context free Grammars, Chomsky normal form, Greibach normal form, Context free languages.

Pushdown Automata Description: Relation between Pushdown automata and context free languages.

MODULE 3

Properties of context free languages

Turing machine: Techniques, modifications, Church's hypothesis, Deterministic context free languages, Enumerable languages, Universal Turing Machine, Rice's theorem.

MODULE 4

Undecidability: Greibach's theorem, Chomsky Hierarchy, Regular Grammars, unrestricted grammars, Context – sensitive languages, Closure properties of families of languages.

TEXT BOOKS

1. Introduction to Automata Theory, Languages and Computation - By Hopcraft and Ullman, Narosa Publishing House.
2. Introduction to languages and the theory of computation – By John C. Martin, Tata McGraw Hill

REFERENCE BOOKS

1. Theoretical Science - By Krishnamurthy, AWEP.
2. Theory of Computer Science - By Brady, McGraw Hill.
3. Computations, Finite and Infinite Machines - By Minsky, Prentice Hall

CE 5.3 MICROPROCESSORS

MODULE 1

Microprocessor 8086: Pin diagram, Instruction cycle, Architecture, Instruction Set, Assembly Language programming, etc. 8086 Basic configuration in maximum mode.

MODULE 2

8087 Coprocessor: Architecture, Connection and cooperation with main processor. Instruction Set of 8087, Programming with the Arithmetic Coprocessor.

MODULE 3

Interfacing:

Programmable Peripheral Interface (PPI) - Basic Description of 8255, Architecture, Modes of operation, programming the 8255.

Programmable timer 8253/8254, USART 8251

A/D and D/A Interfaces.

MODULE 4

System Design: Design of 8086 using Memory chips and simple I/O devices using interfaces. **Microprocessor 80286 and 80386:** Brief features, architecture, Memory management system, task switching protection etc. in 80286. Review processors from 80486 onwards.

TEXT BOOKS

1. Microprocessors and Interfacing: Programming and Hardware, - By Douglas V. Hall, TMH.
2. Microprocessor Systems: The 8086/8088 family architecture programming and design – By Liu and Gibson, PHI
3. Microprocessor Architecture, Programming and Applications - By Ramesh Gaonkar, Wiley Eastern.

REFERENCE BOOKS

1. Microprocessor and Microcomputer Based Systems – By M. Rafiqzaman, PHI.
2. The Intel microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, and Pentium pro processor Architecture, Programming and Interfacing - By Barry B. Brey, PHI

CE 5.4 DATA BASE MANAGEMENT SYSTEMS

MODULE 1

Introduction to Database System Concept: Purpose of database System, View, database administrator, data models, overall system structure, schemes & instances

Database languages & Interfaces, data modeling using the E-R Model.

The Relational Model: Structure of relational Database, Relational Algebra, Domain, Tuple Relational Calculus, Extended Relational Algebra Operation.

MODULE 2

Structured Query Languages (SQL): Data definition, Basic & More Complex Queries, Insert, Delete & Update Statement, Data Definition in SQL Views & Queries in SQL Specifying Constraints & Indexes in SQL, Other Relational Languages.

Relational Database Design: Pitfalls, Decomposition, Normalization, Domain-Key Normal Form, Practical Database Design & Tuning.

MODULE 3

Query Processing & Optimization: Translating SQL Queries into Relational Algebra, Algorithms for Executing Query Operations, Using Heuristics, Selectivity & Cost Estimates in Query optimization.

MODULE 4

Database Recovery Techniques: Recovery Techniques Based On Deferred, Immediate

Update, The ARIES Algorithm, Recovery in Multidatabase Systems.

Database Security & Authorization: Introduction to Database security Issues, Access Control

based on Granting / Revoking of Privileges, Mandatory Access Control for Multilevel

Security, Concurrency.

TEXT BOOKS

1. Fundamentals of Database Systems – By Elmasri & Navathe, Addison Wesley.
2. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill International Edition, IV Edition.

REFERENCE BOOKS

1. Computer Database Organization, James Martin, Prentice Hall International
2. An Introduction to Data Base Systems, C. J. Date, Addison Wesley
3. Data Base Management System, Raghu Ramakrishnan, McGraw Hill International Edition
4. An Introduction to Database Concepts, Desai B Galgotia Publications

CE 5.5 OPERATING SYSTEMS

MODULE 1

Introduction to Operating System

Process Management: Processes, CPU Scheduling, Process Synchronization and deadlocks

Process Management in UNIX/LINUX.

MODULE 2

Storage Management: Memory Management, virtual memory, File system interface and File system, Implementation.

Storage Management in UNIX/LINUX.

MODULE 3

I/O Systems: I/O systems, secondary storage structure and Tertiary storage structure.

I/O Systems in UNIX/LINUX.

MODULE 4

Protection and security issues, Case Study of WINDOWS 98/NT Operating Systems.

Shell Programming in UNIX/LINUX.

TEXT BOOKS

1. The Operating System Concepts – By Silberschatz and Galvin, Wesley Publishing Co.
2. Systems Programming & Operating Systems - By D. M. Dhamdhare, Tata McGraw Hill Publication Co.
3. UNIX – Concepts and applications – By Sumitabha Das, Tata McGraw Hill

REFERENCE BOOKS

1. Operating Systems – By W Stallings. PHI.
2. Operating systems, Design and implementation – By A.S Tanenbaum,PHI.
3. Operating Systems – By Milenkovic, Tata McGraw Hill.
4. Operating Systems – By Achyut S. Godbole, Tata McGraw Hill.
5. The Design of the UNIX Operating System – By Maurice J. Bach, PHI
6. Linux Kernel Internals – By M Beck, H Bohme, M Dziadzka, U Kunitz, R Magnus, D Verworner, Addison Wesley
7. Unix System Programming using C++, Terence Chan, PHI

CE 5.6 COMPUTER HARDWARE DESIGN

MODULE 1

Introduction to Computer Hardware Design

Design methodology, design levels, system building blocks, loading rules, design conventions, introduction to AHPL, concepts, and features.

MODULE 2

Study of AHPL

Hardware programming in AHPL, concept of control design, study of hardwired control, realization of high-speed arithmetic circuits using hardwired techniques.

MODULE 3

Micro Programmed Control

Study of micro programmed control, realization of high-speed arithmetic circuits using micro programmed control

MODULE 4

Introduction to VLSI Design

NMOS and CMOS process, Electrical properties of MOS, NMOS inverter, CMOS inverter, MOS circuit design process.

TEXT BOOKS

1. Digital Systems, Hardware Organization and Design - By Hill and Peterson, John Wiley & Sons.

2. Computer Architecture and Organization - By J. P. Hayes, McGraw Hill
3. Basic VLSI Design - By Douglas Pucknell, PHI

REFERENCE BOOKS

1. Computer Engineering and Hardware Design - By Morris Mano PHI.
2. Principles of CMOS VLSI Design - By Niel Weste & Kamran Eshraghian, Addison Wesley

CE 6.1 OPERATIONS RESEARCH

MODULE 1

Introduction: Introduction to the subject, classification of problems and Mathematical Modeling in Operations Research.

Linear Programming: Formulation of Models, Graphic Solution, Maximization and Minimization of function with and without constraints, The Simplex method, Transportation and Assignment problems.

MODULE 2

Integer Programming: Introduction, Implicit Enumeration, Cutting plane technique.

Branch and Bound Techniques: Introduction, Branch and Bound algorithms for Assignment, Travelling Salesman, Integer and Backpack loading problems.

MODULE 3

Dynamic Programming: Introduction, Investment problem, Solutions to general allocation problems, Stage coach problem, Production scheduling.

Sequencing problem: Two Machine sequencing problem, N-job Three Machine sequencing problem.

MODULE 4

PERT: PERT network, Critical path, Probability of completing event on schedule.

Queuing Theory: Notations and Assumptions, Queuing models.

TEXT BOOKS

1. Introduction to Operations Research: A Computer Oriented algorithm Approach - By Billey E. Gillet, TMH

REFERENCE BOOKS

1. Operations Research - By H. A. Taha, PHI
2. Operations Research - By Fredricks, Hiller and Leibermen, TMH.

CE 6.2 OBJECT ORIENTED DESIGN AND PROGRAMMING

MODULE 1

System Development using Object Orientation

Procedure Oriented and Object Oriented Paradigms, Procedure Oriented Development Tools, Modeling as a design technique.

Object Modeling: Identifying objects and classes, specifying attributes, defining operations.

Object Oriented Analysis: Steps in object oriented analysis, recording analysis w.r.t static & dynamic aspects of classes & systems

MODULE 2

Design: System Design process, principles of a good object oriented design, design patterns with object oriented constructs.

Testing: Method, class, integration and interface testing

Debugging

Case study w.r.t some modeling tool. Eg. UML

MODULE 3

Study of VC++: Introduction to VC++, Windows Programming, windows applications using MFC **Dialog based applications:** Resources, dialog editor, bitmap editor, Dialog boxes

Controls (Child Windows): Buttons, List boxes, Edit controls, Combo boxes, scrollbars, Static controls, Documents and Views

MODULE 4

Design: Writing Text and drawing Graphics, Windows and GDI, Introducing the CDC family

Scrolling and Printing: Scrolling View, MFC printing functions, Menus, Toolbars and Status Bars. Simple design problems.

TEXT BOOKS

1. Object Oriented Modeling and Design – By Rumbaugh et al., Prentice Hall
2. Object Oriented Analysis & Design – By Andrew Haigh, TMH
3. VC++ Programming – By Yeshwant Kanetkar, BPB Publications.

REFERENCE BOOKS

1. OO Software Engineering – The Professional Developers Guide - By George Wilke, Addison Wesley
2. The Complete Reference Visual C++ 6 – By Chris H. Pappas & William H. Murray, TMH
3. Beginning VC++ - By Ivor Horton
4. VC++ programming – By Gilbert and Carty.

CE 6.3 ARTIFICIAL INTELLIGENCE

MODULE 1

Introduction to AI, AI techniques: Problems, problem spaces & search, problem solving methods, production system characteristics, design issues of production system

Heuristic search techniques, hill climbing, best first search, problem reduction, A*, AO* algorithm, means end analysis.

Knowledge representation: Representation & mappings, approaches to knowledge representation.

MODULE 2

Predicate logic: Symbolic reasoning under uncertainty, monotonic & non monotonic reasoning

Statistical reasoning, fuzzy logic

Weak slot-and-filler structures, semantic nets, frames

Strong slot-and-filler structures, conceptual dependency, scripts

MODULE 3

Game playing, min -max search procedure, adding alpha-beta cutoffs

Planning an example domain: The blocks world, components of a planning system, goal stack planning, non linear planning & hierarchical planning

Natural language processing: Introduction, syntactic, semantic, discourse & pragmatic processing

MODULE 4

Learning: Definition, rote learning, learning by taking advice, learning in problem solving, learning from examples

Expert systems: Definition, components, expert system shell, application, knowledge acquisition

Neural networks: Introduction, basics of AI neural networks, characteristics terminology, models of neural & topology, learning in neural networks.

TEXT BOOKS

1. Artificial Intelligence - By Rich & Knight, McGraw Hill.

REFERENCE BOOKS

1. Neural networks & fuzzy logic – By Dart Kooks, PHI
2. Artificial neural networks – By Vegnarayana, PHI
3. Artificial Intelligence – By Winston, PHI

CE 6.4 COMPUTER GRAPHICS

MODULE 1

Basic Concepts: Overview of graphics system, output primitives, Line drawing Algorithm, circle generating, Ellipse generating, parallel line algorithm, Fill area primitives and functioning, Attributes of output primitive.

MODULE 2

2D transformation: Principles and matrix representation, Composite transformation, reflection and shear. Clipping and windowing

Interactive graphics: Graphical input devices, Input technique, Event handling, input functions, Raster Graphics.

MODULE 3

3D concepts: Realism in 3D graphics, 3D Object representation, 3D geometry and modeling transformation, 3D viewing.

Curves and Surfaces, respective depth, Hidden Surface illumination, shading

Segment and display files, display file compilation, geometric models, picture structure, graphic package.

MODULE 4

Computer Animation: Colour models and Colour application, visible surface detection methods.

Illumination models surface rendering methods.

Graphic systems: Display processor, user interface designs, device independent graphics system.

TEXT BOOKS

1. Computer Graphics – By Donald Hearn and M. P. Baker, PHI.
2. Principles of Interactive Graphics – By Newman and Sproull, McGraw hill.

REFERENCE BOOKS

1. Computer Graphics – By Steven Harrington, Tata McGraw Hill.
2. Compute Graphics: Principles and Practice – By Foley, Van Dam, Feiner and Hughes
3. Introduction to Computer Graphics – By N. Krishnamurthy, TMH
4. Procedural Elements for Computer Graphics – By David F. Rogers, TMH

CE 6.5 DEVICE INTERFACING AND PC MAINTENANCE

MODULE 1

8259 – Programmable interrupt controller: Block diagram, working principle and operation in a PC system.

8257 - DMA controller: Block diagram, working principle and operation in a PC system.

8275 – CRT controller: Block diagram, interface to a video monitor and PC system, types of display devices; their construction and working principle, display modes

8279 – Keyboard / Display controller: Block diagram, working principle and interface to a PC system. Organization of a keyboard, types of keyboards and key switches, interfacing of a keyboard.

MODULE 2

Secondary storage devices: Hard disk drives: Construction, working principle, installation procedure for single and multiple drives, partitioning and interfacing to a PC system.

Floppy disk drive: Construction, working principle, drive assembly, recording techniques and interfacing to a PC system.

8272 – Floppy disk controller: Block diagram, working principle and interface to drive and PC system.

CDROM Drive: Construction, working principle and interface to a PC system.

MODULE 3

I/O interfaces: IDE and SCSI

Buses: Types of buses

Printers: Types of printers, working principle, troubleshooting, Centronic Printer Interface.

Plotters: Types of Plotters.

Power Supply Units: SMPS, UPS, construction, working principle, power line problems and counter measures.

MODULE 4

Troubleshooting and fault finding: Types and nature of faults, fault diagnosis and trouble shooting for each subsystem in a PC.

Diagnostic tools: Logic probe, logic pulser, logic analyzer, IC tester, digital oscilloscope

Diagnostic software: Types, preventive maintenance for a PC system.

TEXT BOOKS

1. Troubleshooting, Maintenance and Repairing PCs - By Stephen Bigelow, TMH
2. Advanced Microprocessors and Peripherals: Architecture, Programming and Interfacing – By Ray and Bharchandani, TMH

3. IBM PC and Clones – Hardware, Troubleshooting and Maintenance – By Govindarajalu, TMH

REFERENCE BOOKS

1. Microprocessors and Interfacing – By D.V. Hall, TMH
2. The Complete PC Upgrade and Maintenance Guide – By Mark Minasi, BPB Publications
3. Upgrading and Repairing PCs – By Scout Muller, PHI

CE 6.6 COMPUTER NETWORKS – I

MODULE 1

Introduction to Data Communications: Data transmission, concepts and terminology, analog and digital data transmission, transmission media, data encoding.

MODULE 2

Data Communication: Synchronous / Asynchronous transmission, interfacing, error detection, error control, interfacing, flow control, control protocols (HDLC).

MODULE 3

Computer Networks - Introduction: Network goals and applications, line configuration, network topology, transmission modes, network categories, circuit and packet switching, Layers in the OSI reference model and TCP/IP model.

MODULE 4

Data Link Layer: Data link layer design issues, elementary data link protocols, sliding window protocols, protocol specification and verification.

TEXT BOOKS

1. Data and Computer Communications – By Williams Stallings, PHI.
2. Data communication and Networking – Behrouz A. Forouzan, Tata McGraw Hill

REFERENCE BOOKS

1. Computer Networks – By Andrew S. Tannenbaum, PHI.
2. Computer Networks and Distributed Processing - By James Martin, PHI
3. Network Programming – By Richard Stevens, PHI.
4. Data Networks – By Dmitri and Bertsekas, Wiley Eastern.