# COMPUTER SCIENCE & ENGINEERING

## 3rd Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Periods</th>
<th>Uty. Exam duration (hours)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RT301</td>
<td>Engineering Mathematics II</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>B</td>
<td>R 302</td>
<td>Micro Processor Systems</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>C</td>
<td>RT 303</td>
<td>Solid State Electronics</td>
<td>2 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>D</td>
<td>RT 304</td>
<td>Problem Solving and Computer Programming</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>E</td>
<td>RT 305</td>
<td>Humanities</td>
<td>2 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>F</td>
<td>R306</td>
<td>Logic System Design</td>
<td>3 1 -</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>G</td>
<td>R 307</td>
<td>Solid State Electronics Lab</td>
<td>0 0 4</td>
<td>50 - 100 150</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>R 308</td>
<td>Programming Lab</td>
<td>0 0 4</td>
<td>50 - 100 150</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>16 6 8</td>
<td>400 600 200 1200</td>
<td></td>
</tr>
</tbody>
</table>

## 4th Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Periods</th>
<th>Uty. Exam duration (hours)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CMELRPTA401</td>
<td>Engineering Mathematics III</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>B</td>
<td>R 402</td>
<td>Computer Organization</td>
<td>2 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>C</td>
<td>R 403</td>
<td>Object Oriented Programming</td>
<td>2 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>D</td>
<td>R 404</td>
<td>Integrated Circuits</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>E</td>
<td>R 405</td>
<td>Data Structures and Programming Methodologies</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>F</td>
<td>R406</td>
<td>Advanced Microprocessors and Peripherals</td>
<td>3 1 - 3</td>
<td>50 100 - -</td>
<td>150</td>
</tr>
<tr>
<td>G</td>
<td>R 407</td>
<td>Integrated Circuits Lab</td>
<td>0 0 4</td>
<td>50 - 100 150</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>R 408</td>
<td>Data Structures Lab</td>
<td>0 0 4</td>
<td>50 - 100 150</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>16 6 8</td>
<td>400 600 200 1200</td>
<td></td>
</tr>
</tbody>
</table>
### 5th Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Periods</th>
<th>Uty. Exam duration (hours)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>P</td>
</tr>
<tr>
<td>A</td>
<td>RT501</td>
<td>Engineering Mathematics IV</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>R 502</td>
<td>Operating Systems</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>RT503</td>
<td>Database Management Systems</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>R 504</td>
<td>File Structures and Algorithms</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>RT505</td>
<td>Language Processors</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>RT506</td>
<td>Data Communication</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>R 507</td>
<td>Microprocessor Lab</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>H</td>
<td>R 508</td>
<td>Database Lab</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>16</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

### 6th Semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Periods</th>
<th>Uty. Exam duration (hours)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>T</td>
<td>Prac./ Proj.</td>
</tr>
<tr>
<td>A</td>
<td>R 601</td>
<td>PC &amp; PC based Systems</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>RT602</td>
<td>Software Engineering</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>R 603</td>
<td>Project Management and Quality Assurance</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>RT604</td>
<td>Computer Networks</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>RT605</td>
<td>Network Computing</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>R 606</td>
<td>Algorithm Analysis and Design</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>R 607</td>
<td>System Software Lab</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>H</td>
<td>R 608</td>
<td>Mini Project</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>16</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>
### 7TH SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Periods</th>
<th>Uty. Exam duration (hours)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RT701</td>
<td>Object Oriented Modeling and Design</td>
<td>2 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>B</td>
<td>RT702</td>
<td>Computer Graphics</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>C</td>
<td>R 703</td>
<td>Theory of Computation</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>D</td>
<td>R 704</td>
<td>Advanced Software Environments</td>
<td>2 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>E</td>
<td>RT705</td>
<td>Web Technologies</td>
<td>2 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>F</td>
<td>R 706</td>
<td>Elective I</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>G</td>
<td>R 707</td>
<td>Computer Hardware and Networking Lab</td>
<td>0 0 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>H</td>
<td>R 708</td>
<td>Network Programming Lab</td>
<td>0 0 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>I</td>
<td>R 709</td>
<td>Project &amp; Seminar</td>
<td>0 0 Prac./ Proj.</td>
<td>- - - -</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1200</td>
</tr>
</tbody>
</table>

### 8TH SEMESTER

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course No.</th>
<th>Subject</th>
<th>Teaching Periods</th>
<th>Uty. Exam duration (hours)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>RT801</td>
<td>Security in Computing</td>
<td>2 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>B</td>
<td>R 802</td>
<td>High Performance Computing</td>
<td>2 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>C</td>
<td>R 803</td>
<td>Principles of Programming Languages</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>D</td>
<td>RT804</td>
<td>Artificial Intelligence</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>E</td>
<td>R 805</td>
<td>Elective II</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>F</td>
<td>R 806</td>
<td>Elective III</td>
<td>3 1 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>G</td>
<td>R 807</td>
<td>Graphics and Multimedia Lab</td>
<td>0 0 Prac./ Proj.</td>
<td>3 50 100</td>
<td>150</td>
</tr>
<tr>
<td>H</td>
<td>R 808</td>
<td>Project &amp; Seminar</td>
<td>0 0 Prac./ Proj.</td>
<td>4 100</td>
<td>100</td>
</tr>
<tr>
<td>I</td>
<td>R 809</td>
<td>Viva-Voce</td>
<td>- - Prac./ Proj.</td>
<td>- - 50</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1200</td>
</tr>
</tbody>
</table>
THIRD SEMESTER
ENGINEERING MATHEMATICS - II

Module 1
Mathematical Logic - Statements, connectives - Well formed formulas –
Tautologoes - Equivalence of formulas - Duality law Tautological implications -
Normal forms - the theory of inference for the statement - Calculus - validity,
Consistency, Theorem proving - the predicate calculus - Inference Theory of the
predicate calculus.

Module 2
Number Theory: Prime and Relatively prime numbers – Modular arithmetic –
Fermat’s and Euler’s Theorems – Testing for Primability – Euclids Algorithm –
Discrete Logarithms
Relations & Functions - Properties of binary relations - Equivalence relations and
partitions - Functions and pigeon hole principle.

Module 3
Algebraic systems - general properties - Lattices as a partially ordered set - some
properties of lattices - lattices as algebraic systems - sub lattices - direct product -
homomorphism - some special lattices.

Module 4
Discrete Numeric Functions & generating Functions, Recurrence relations -
Manipulations of Numeric functions - generating functions - Recurrence relations
- Linear recurrence relations with constant coefficients - Homogeneous solutions
- Particular solutions - Total solutions - solutions by the method of generating
functions.

Module 5
Graph Theory: Basic concept of graphs, subgraphs, connected graphs, Paths,
Cycles, Multigraph and Weighted graph - Trees - spanning trees.

References
2. Discrete mathematical structures with applications to Computer Science - J.P.
   Trembly, R. Manohar, McGraw Hill.
3. Discrete Mathematics - Richard Johnsonbaugh, Pearson Education Asia
4. Discrete Mathematical Structures - Bernard Kolman, Robert C. Bushy, Sharon
   Cutler Ross, PHI
5. A first look at Graph Theory - John Clark & Derek Allan Holton, Allied
   Publishers
6. Cryptography and network security principles and practice - William Stallings,
   Pearson Education Asia
Module 1
CPU, I/P unit, O/P unit, Memory, Bus organizations, ALU, Control Unit, Registers, Execution of an instruction, Main memory, Addressing, Memory Address Register - Memory Data Register – Memory systems - Architecture of 8085- Pin Diagram - Registers.

Module 2
Instruction set of 8085 - Instruction Types – Arithmetic – Logic data transfer, Branch, Stack, I/O and Machine Control instructions - Addressing Modes - Direct and Indirect Addressing - Immediate Addressing - Implicit Addressing.

Module 3

Module 4

Module 5
Interfacing Memory and I/O devices - Address space partitioning - Memory mapped I/O - I/O mapped I/O - Memory interfacing - interfacing EPROM & RAM to 8085 – Data transfer schemes - Programmed data transfer - synchronous and asynchronous transfer - interrupt driven data transfer – DMA data transfer – DMA controller – 8257 – I/O channels.

References
1. Microprocessor Architecture, Programming and Applications with the 8085 - Gaonkar, New Age International
2. Microprocessors, interfacing and Applications - Renu Singh, B. P. Singh, New Age International
3. Microprocessors - B. Ram
4. Introduction to Microprocessors Systems - Adithya P. Mathur, PHI
5. Microprocessors Peripherals and Applications - Gilmore
SOLID STATE ELECTRONICS

RT303               2+1+0

Module 1
Transistor – Biasing - Stability - Thermal runaway. Transistor As an amplifier -
RC coupled amplifier, Frequency Response, Gain Bandwidth relation - Cascading
of transistors - cascade Darlington pair - emitter follower

Module 2
FET, FET amplifier – MOSFET, depletion and enhancement type - source drain
characteristics and transfer characteristics.

Module 3
Oscillators - Concept of feed back - Transistorised phase shift oscillator - wien
bridge Oscillator – Hartley Oscillator - Colpits Oscillator (Operation and
Expression for frequency)

Module 4
Clipping, Clamping, Integration, Differentiation - Astable, Bistable and
Monostable Multivibrators - Sweep generators, Simple Bootstrap sweep
generators.

Module 5
Power supplies & Special semi conductor devices - Regulator power supplies –
IC regulated Power supplies, 7805, 7905, LM317 – LED, LCD, Photodiode,
Photo transistor, opto coupler. Seven segment display, SCR, UJT (basic concepts
only), DIAC, TRIAC.

References
1. Integrated Electronics - Millman and Halkias, McGraw Hill
3. Electronics Devices & Circuits - Boylsted & Neshelsky, Pearson Education

PROBLEM SOLVING AND COMPUTER PROGRAMMING

RT 304               3+1+0
Module 1
Problem solving with digital Computer - Steps in Computer programming - Features of a good program - Modular Programming - Structured - Object Oriented - Top down and bottom up approaches - Algorithms - Flowchart - Pseudocode, examples

Module 2
C fundamentals: Identifiers, keywords, data types, operators, expressions, data Input and Output statements, simple programming in C.

Module 3
Control statements & Functions: If - else, for, while, do - while, switch, break & continue statements, nested loops. Functions - parameter passing - void functions Recursion – Macros.

Module 4
Structured data types: Single dimensional arrays - multidimensional arrays, strings, structures & unions - Program for bubble sort.

Module 5
Pointers & files - Declaration, passing pointers to a functions- Accessing array elements using pointers - Operations on pointers - Opening & Closing a file - Creating & Processing a file, Command line arguments.

Text Book
1. Programming with C - Byron S. Gottfried, Tata McGraw Hill

References
1. Computer Programming in C - Kerninghan & Ritchie, PHI
2. Programming with ANSI and Turbo C - Ashok N. Kamthan, Pearson Eduacation
3. Let us - Yeaswanth Khanetkar, BPB
4. Programming in C - Stephen C. Kochan, CBS publishers
5. Using C in Program Design - Ronald Leach, Prism Books Pvt. Ltd, Bangalore
6. Mastering Turbo C - Bootle, BPB Publications
7. Programming and Problem Solving with PASCAL - Micheal Schneider, Wiley Eastern Ltd.
8. Pointers in C - Yeaswanth Khanetkar, PBP
10. Structured and Object Oriented Problem Solving using C++ - Andrew C Staugaard Jr., PHI
PART A: PRINCIPLES OF MANAGEMENT

Module 1

Module 2

PART B: ENGINEERING ECONOMICS

Module 3

Module 4

Module 5

References
1. Management- Stoner, Freeman and Gilbert, PHI
2. Engineering Management- Mazda, Pearson Education
3. Indian Economy - Ruddar Datt, S Chand and Company Ltd.
Module 1
Addition, Subtraction, Multiplication & division of binary nos, BCD nos, excess-3 code, gray code, alphanumeric codes, error detection using parity bits - error correcting codes, haming code.

Module 2

Module 3
Sequential logic - flip flops - SR, JK, T & D flip flops - master slave JK flip flop, Counters - asynchronous, binary decade, and up/down counters - synchronous binary decade, and up/down counters.

Module 4
Adders - design - Half adder, Full adder, Half subtractor & Full subtractor - Carry look ahead adder, carry save adder, carry propagation adder.

Module 5
Registers - serial in & parallel in shift registers - left & right shift registers - static shift registers - typical IC’s - counters using shift registers - ring counter, Johnson counter.

References
1. An introduction to digital computer design - Rajaraman & Radhakrishnan, PHI
6. Digital Design - Morris Mano, Pearson Education

SOLID STATE ELECTRONICS LAB

1. Characteristics of Silicon, Germanium, Zener diodes.
2. Characteristics of CE, CB configurations of transistors; Characteristics of FET.
3. Clipping and clamping Circuits - RC differentiating and Integrating Circuits.
4. Half wave and full wave an Bridge rectifiers.
5. Single stage RC coupled amplifiers - Frequency response
6. Astable multivibrators using BJT.
7. Sweep Generator (Simple sweep)
8. Oscillators - Rc phase shift oscillator.

PROGRAMMING LAB

1. Familiarisation with computer system microprocessor - peripherals - memory card etc.
2. Familiarisation of operating system - DOS Windows etc. (use of files, directories, internal commands, external commands, compilers, file manager, program manager, control panel etc.)
3. Familiarisation with word processing packages like wordstar and Msword
4. Programming experiments in C to cover control structures - functions - arrays - Structures - pointers and files.
5. Familiarisation of C++ and Visual tools.

Any experiment according to the syllabus of RT304 problem solving and Computer Programming can be included.
FOURTH SEMESTER
Module 1

Module 2
Partial Differential Equations - formation by eliminating arbitrary constants and arbitrary Functions - solution of Lagrange Linear Equations – Charpits Method – solution of homogeneous linear partial differential equation with constant coefficients – solution of one dimensional wave equation and heat equation using method of separation of variables – Fourier solution of one dimensional wave equation.

Module 3

Module 4
Probability and statistics: Binomial law of probability - The binomial distribution, its mean and variance - poisson distribution as a limiting case of binomial distribution - its mean and variance - fitting of binomial & poisson distributions - normal distribution - properties of normal curve - standard normal curve - simple problems in binomial, poisson and normal distributions.

Module 5
Population & Samples: Sampling distribution of mean (σ known) – Sampling distribution of variance, F and Chi square test – Level of significance - Type 1 and Type 2 errors – Test of hypothesis – Test of significance for large samples – Test of significance for single proportion, difference proportion, single mean and difference of mean (proof of theorems not expected)

References
7. Probability and statistical inferences – Hogg and Tanis, Pearson Education Asia

**COMPUTER ORGANIZATION**

**Module 1**

**Module 2**
CPU - Arithmetic: Signed addition and subtraction – serial and parallel adder – BCD adder – Carry look ahead adder, Multiplication – Array multiplier – Booth’s Algorithm, Division – Restoring and non-restoring division, floating point arithmetic - ALU Design.

**Module 3**

**Module 4**
Memory: Memory hierarchy – RAM and ROM – Memory system considerations – Associative memory, Virtual memory – Cache memory – Memory interleaving.

**Module 5**

**References**
2. Digital Logic and Computer Design - Morris Mano, PHI
OBJECT ORIENTED PROGRAMMING

Module 1
Introduction to OOP - Evolution of object oriented languages - Need of Objects - Definition of Object-Oriented Language – Classes and Objects – Creating and Using Classes and objects – Member functions and variables – Constructors and Destructors.

Module 2

Module 3

Module 4
Advanced Concepts- Virtual Destructors – Virtual Base Classes - Template classes – Creating and using templates – Namespaces

Module 5
Dynamic Objects - Dynamic object allocation - Inline functions.
Other Object oriented languages – Java – Object oriented features in Java – Comparison with C++

References

2. Object Oriented Programming in C++ - Nabajyoti Barkakati, PHI
3. Structured and Object Oriented Problem Solving using C++ - Andrew C Staugaard Jr., PHI
4. Object oriented Programming with C++ - E. Balaguruswamy, TMH
5. Java 2 Complete Reference - Herbert, Schildt, TMH
7. Object-oriented programming using C++ - Ira Pohl, Pearson Education Asia
8. C++ How to program - Dietel & Dietel, Pearson Education Asia
9. An Introduction to Object-oriented programming – Timothy Budd
10. Problem Solving with C++ - Walter Savitch, Pearson Education Asia
11. C++ Primer - Stanley B Lippman, Josee Zajoie, Pearson Education Asia
INTEGRATED CIRCUITS

Module 1
Logic Families - DTL - TTL - ECL - I\textsuperscript{2}L & CMOS. Comparison of circuits. Tristate logic - Propagation delay - power dissipation - Noise margin window profile - comparison - Fan in - Fan out.

Module 2

Module 3
D/A Converters - Binary weighted resistor type - Ladder type A/D converters – counting type - Successive approximation type - Parallel comparator type dual slope type.

Module 4
Opamps: Characteristics - Basic principles - definitions - parameters - Input, Offset, Voltage, Input bias current, CMRR, slew rate - Ideal Opamp - inverting and non inverting opamps.

Module 5
Opamp Applications: Summing, Comparator, Differentiator - Integrator - Square wave generator - Triangular wave generator using opamps.

References
3. Digital design with standard MSI & LSI by T.R. Blakesley & John Willey.
4. Integrated Circuits - Botkar, Khanna Publishers

DATA STRUCTURES & PROGRAMMING METHODOLOGIES

Module 1
Module 2

Module 3
Linked Lists - Linked stacks and queues - Doubly linked lists - Polynomial representation using linked lists, Strings – Data representation – Pattern matching.

Module 4

Module 5
Sorting methods: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Heap sort, Radix sort, External sorting methods (basic idea only).

References
2. Classic Data Structures: Samanta, PHI
3. Data Structures and program design in C: Robert Kruse, Pearson Education Asia
4. Data Structures using C & C++: Langsam, Augenstein & Tanenbaum
6. Algorithms + Data Structures = Programs: N.Wirth, PHI
8. Data structures in Java: Thomas Standish, Pearson Education Asia

ADVANCED MICROPROCESSORS & PERIPHERALS
R 406 3+1+0

Module1
Study of Interfacing ICs - 8255, 8252, 8251, 8279 (functions and internal block diagram only)

Module 2
Interfacing with 8085 - Interfacing keyboard – Hardware and Software approach – Interfacing seven segment displays - Interfacing D/A and A/D converters - Micro controllers (brief idea only)

Module 3
Module 4

Module 5
Additional features of 80386 – Paging mechanism – Interfacing coprocessors in 80386 – Additional features of Pentium Processors. Brief study of latest processors of Intel & AMD (Architecture not required) – Introduction to RISC processors

References
1. Microprocessor Architecture, Programming and Applications with the 8085 - Gaonkar, New Age International
2. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro processors. Architecture, Programming and Interfacing – Barry B Bray, Pearson Education Asia
3. The 80X86 family - John Uffenbeck, PHI
4. Introduction to the Intel Family of Microprocessors - James L.Antonakos, Pearson Education Asia
5. Intel Microprocessors - A.K.Ray
6. Microprocessors and Interfacing - Douglas V. Hall, TMH
8. The Intel 8086/88 Microprocessor Architecture, Programming Design and Interfacing – Bhupendra Singh Chhabra, Dhanpat Rai Publishing Company (P) Ltd
9. IBM PC and Clones - Govindarajalu, TMH

INTEGRATED CIRCUITS LAB

R407 0+0+4

1. OP-amp Characteristics
3. Differentiating and Integrating Circuits - frequency response.
5. A/D Converter.
6. D/A Converter.
7. Transfer Characteristics and specifications of TTL and MOS gates.
8. Study of flip flops
9. Synchronous and Asynchronous Counters
10. Astable and Monostable multivibrators using gates.
11. Study of shift registers and their applications.
12. Study of decoders and Multiplexers.

**DATA STRUCTURES LAB**

**R408**

Experiments based on the following:

1. Array and Linked list implementation of Stacks, Queues, Dqueues, Graphs, Binary Trees, Polynomials, Sparse matrix.
2. Infix, Postfix and Prefix conversions.
3. Sorting and Searching methods.
4. String representation and pattern matching

Any experiment according to the syllabus of R405 can be substituted.
FIFTH SEMESTER
Module 1
QUEUEING THEORY: General Concepts - Arrival pattern - service pattern - Queue disciplines - The Markovian model M/M/1/\$, M/M/1/N - steady state solutions – Little’s formula.

Module 2

Module 3
FINITE DIFFERENCES: Meaning of operators – $\Delta$, $\nabla$, $\mu$, $\delta$, $\epsilon$ - interpolation using Newton’s forward and backward formula - Langrange’s and Newton’s divided difference interpolation formula - numerical differenciation - first and second order derivatives using forward and backward formula - numerical integration - trapizoidal rule - Simpson’s 1/3 and 3/8 rules.

Module 4
LINEAR PROGRAMMING PROBLEM : graphical solution of LPP- general problem - solution of LPP using simplex method - Big M method – duality in LPP.

Module 5
TRANSPORTATION AND ASSIGNMENT PROBLEM: Balanced transportation problem - initial basic feasible solution -Vogel’s approximation method - optimum solution by Modi method - Assignment problem - Hungerian techniques

References
4. Operations research - Richard Bronson, Schaum’s Outline Series
5. Operations research - Panneer Selvam, PHI
OPERATING SYSTEMS

Module 1  Introduction

Module 2  Process Management

Module 3  Process Synchronization & Interprocess Communication

Module 4  Memory Management
Objectives and functions, Simple Resident Monitor Program (No design), Overlays – Swapping; Schemes – Paging – Simple, Multi-level Paging; Internal and External Fragmentation; Virtual Memory Concept, Demand Paging - Page Interrupt Fault, Page Replacement Algorithms; Segmentation – Simple, Multi-level, Segmentation with Paging, Memory Management in UNIX.

Module 5  Information Management

Text Book

References
2. Operating Systems: Design & implementation - Andrew S. Tenenbaum, PHI
DATA BASE MANAGEMENT SYSTEMS

Module 1
Basic Concepts - Purpose of database systems - Components of DBMS - DBMS Architecture and Data Independence - Data modeling - Entity Relationship Model, Relational – Network- Hierarchical and object oriented models - Data Modeling using the Entity Relationship Model.

Module 2
Structure of relational databases – relational databases – relational algebra - tuple relational calculus. Data definition with SQL, insert, delete and update statements in SQL – views – data manipulation with SQL.

Module 3

Module 4

Module 5
Distributed databases: Distributed Database Concepts - Data Fragmentation, Replication and Allocation Techniques - Different Types - Query Processing – semijoin - Concurrency Control and Recovery.

Text Book
1. Fundamentals of Database System Elmasri and Navathe (3rd Edition), Pearson Education Asia

References

2. An Introduction to Database Systems - C.J.Date (7th Edition) Pearson Education Asia
4. An Introduction to Database Systems - Bibin C. Desai

FILE STRUCTURES AND ALGORITHMS

R504 2+1+0

Module 1

Module 2

Module 3

Module 4

Module 5
Storage management: - Dynamic storage management- storage allocation & liberation – First fit, best fit – Buddy system- Garbage Collection & Compaction.

References

1. Fundamentals of Data Structures in C++: Horowitz, Sahni & Mehta, Galgotia publications
4. Data Structures using C & C++: Langsam, Augenstein & Tanenbaum, Pearson Education Asia
5. Data Structures, Algorithms and Applications in C++: Sahni Galgotia publications
6. Data structures & Program design in C: Robert Kruse Pearson Education Asia

**LANGUAGE PROCESSORS**

**RT 505**

**Module 1  Assembler**

**Module 2  Introduction to Compilers**
Compilers and Translators – Structure of a compiler – lexical analysis – syntax analysis – context free grammars – basic parsing techniques- top down and bottom up parsing (brief idea only)- Recursive Decent parser – Shift reduce parser.

**Module 3  Storage allocation**
Data descriptors- Static and Dynamic storage allocation – Storage allocation and access in block structured programming languages – Array allocation and access- Compilation of expressions – Handling operator priorities – Intermediate code forms for expressions –code generator.

**Module 4  Compilation of Control Structures**
Control transfer- Conditional and Iterative constructs- Procedure calls – Code optimization – Optimization transformations – Local optimization and global optimization – Compiler writing tools – Incremental Compilers

**Module 5  Loaders and Linkers**

**Text Book**
1. System Programming and Operating Systems - Dhamdhere Mc Graw Hill

**References**
3. Compilers Principles Techniques And Tools Aho, Sethi, Ullman, Pearson Education Asia
Module 1

Module 2
Multiplexing - Frequency Division Multiplexing (FDM) – Time Division Multiplexing (TDM), Synchronous Time Division Multiplexing – Statistical time Division multiplexing – Key Techniques - ASK, FSK, PSK, DPSK - Channel capacity - Shannon’s Theorem.

Module 3
Digital data transmission – Serial, Parallel, Synchronous, Asynchronous and Isochronous transmission. Transmission mode- Simplex - Half duplex – Full duplex, Noise- different types of noise – Basic Principles of Switching (circuit, packet, message switching)

Module 4

Module 5
Terminal handling – Point to point, Multidrop lines. Components of computer communication – Concentrators - Front end Processor – Transmission media – Guided media – Twisted pair cable, coaxial cable, fibre optic cable. GSM service and GSM system architecture.

References
1. Electronic communication system - Kennedy, Mc Graw Hill.
4. Data Communication, Computer Networks & Open Systems - Fred Halsall Pearson Education Asia
5. Principles & Application of GSM. - Vijay K. Garg Pearson Education Asia
7. Computer Networks - A.S. Tanenbaum, PHI

MICROPROCESSOR LAB

R507 0+0+4

1. Familiarization of training kits.
2. Simple programs for Arithmetic and Data Transfer.
5. Interfacing the Trainer Kit.
6. Any experiment according to the syllabus R302 can be substituted

DATABASE LAB

R508 0+0+4

Experiments for performing the following:

1. Creation, insertion, updation, deletion of tables, indexes, views
2. Simple queries, nested queries, use of arithmetic and string functions.
3. Simple PL/SQL programs, use of exceptions, savepoints, cursor, procedure, function, trigger, sequence generator.
4. Importing and Exporting data.
5. Database Administration
6. ODBC/JDBC Interface.
7. Implementation of File Structures

Any experiment according to the syllabus of RT503 can be substituted.
SIXTH SEMESTER
PC & PC BASED SYSTEMS

Module 1  Introduction to PC
Hardware components – study of motherboards — Different types of ports, slots and connectors - Add-on cards - Power supply – SMPS - function & operations.

Module 2  Storage Devices

Module 3  Optical Storage

Module 4  Memory Management in PC

Module 5  Bus Structures
ISA, PCI, PCMCIA, AGP, USB, Hard Disk Interfaces – IDE, EIDE, ATA – Communication ports – Serial – Parallel port – Keyboard / Mouse Interface connectors.

References

1. PC Hardware Complete Reference - Craig Zacker & John Rourke, Tata McGraw Hill
2. Inside the PC (8th Edition) - Peter Norton, BPB
3. The Indispensable PC Hardware Book - Messmer, Pearson Education
4. Troubleshooting and Repairing Your PC - Corey Candler, Wiley
5. Upgrading and repairing PC’s (4th edition) - Scott Mueller, Pearson Education
6. IBM PC Assembly Language Programming - Abel, PHI
7. PC Upgrading Maintenance & Trouble shooting guide - Dr. S. K. Chauhan, Kataria
SOFTWARE ENGINEERING

Module 1  Introduction to Software engineering

Module 2  Project Planning

Module 3  System Design

Module 4  Coding
Top-down and Bottom-up - Structured Programming - Information Hiding - Programming style - Internal Documentation – Verification - Code Reading - Static Analysis - Symbolic execution - Proving Correctness - Code inspections – Unit testing.

Module 5  Testing

Text Book
1. An integrated approach to Software Engineering - Pankaj Jalote, Narosa Publication

References
2. Software Engineering - Ian Sommervilla, Pearson Education
3. Software Engineering Theory and Practice - Shari Lawrence, Pearson Education Asia
5. Fundamentals of Software Engineering – Carlo Ghezzi, Mehdi Jazayeri, PHI

PROJECT MANAGEMENT AND QUALITY ASSURANCE

R603 2+1+0

Module 1  PROJECT PLANNING
Overview – Capital expenditure - Phases of capital budgeting – Project development cycle – 7-s of project management – Requirements of a project manager – Forms of project organization.

Module 2  PROJECT ANALYSIS

Module 3  CONTROL OF PROJECT
Control Systems – Control of major constraints – Project management software & information systems.
REVIEW: Performance of Evaluation – Abandonment Analysis – Behavioral issues in Project Management

Module 4  TOTAL QUALITY MANAGEMENT

Module 5  CONCEPTS IN SAMPLING
Sampling designs and schemes – Errors in sampling – Simple random sample – stratified random sample – Cluster sample.

References

3. Project Management - Harvey Maylor - Pearson Education
Module 1

Module 2
Data Link Layer: Design issues-Error Detection and correction – Elementary Data link protocols- Sliding window protocols.
LAN Protocols: Static & Dynamic channel allocation in LAN’s and WAN’s, Multiple access protocols – ALOHA – Pure ALOHA – Slotted ALOHA – Carrier Sense Multiple Access protocols – persistent and non-persistent CSMA – CSMA with collision detection – IEEE 802.3 standards for LAN

Module 3

Module 4

Module 5
Application Layer: Domain name system – DNS name space – Resource records – Name servers – operation of DNS - Electronic Mail – MIME

References
2. An Introduction to computer networking: Kenneth C. Mansfield Jr., James L. Antonakos, Prentice-Hall India
5. Computer Networking: James F Kurose & Keith W Ross, Pearson Education
6. Introduction to Data Communications and Networking: Behrouz, Forouzan, McGraw Hill

NETWORK COMPUTING

RT 605 3+1+0

Module 1
HTML Documents Basic Tags for Font & Paragraph Formatting Lists, Tables, Frames, image Maps
Cascading Style Sheets Style Element, Inline style sheets, Embedded style sheets, External Style sheets, CLASS Attribute, Absolute and relative positioning of elements, DIV & SPAN Tags.

Module 2
Dynamic HTML Pages Client side scripting - Java Script – variables, Arithmetic operations – message boxes, Arrays, control statements, functions, event handling, document object model.
Dynamic updating of pages with JAVA Script.
Embedding ActiveX controls - using the structured graphics – ActiveX Control.

Module 3
Java programming – Features of Java, Creating & using classes in Java – Static classes – Inheritance – Final methods, variables and classes – Interfaces - Nested classes – Inner classes – Anonymous Inner classes – Exception handling – Creating & using exceptions, Multithreaded programs and thread synchronization, creating and using packages. Creating GUI with AWT and Swing – -JDK1.1 event model

Module 4
Module 5
HTTP Protocol working – HTTP methods, GET, PUT, DELETE, POST, HEAD
Server side scripting – HTML Forms & CGI – GET & POST, Basic working of a
CGI supported web server – Simple CGI program in C to validate user name &
Password. Email: Working of SMTP and POP protocols (Overview only).

References

Module 1,2,5
1. Internet and World Wide Web How to program - Deitel, Deitel & Nieto, Pearson
   Education Asia
2. HTML, DHTML, Java Script, Perl, CGI - Evan Bayross, BPB

Module 3,4,5
4. Java 2, AWT, Swing, XML and JavaBeans Programming Black Book – Steven
   Holzner, Wiley Dreamtech
   Education Asia
7. Computer Networks - Tenanbaum, PHI/ Pearson Education Asia

Additional References

8. Unix Network Programming - Stevens W Richard, PHI
9. TCP/IP Protocol suite, 2/e -Behrouz A. Forouzan, TMH

ALGORITHM ANALYSIS AND DESIGN

R606 3+1+0

Module 1 Introduction and Complexity
What is an algorithm – Properties of an Algorithm, Difference between
Algorithm, Computational Procedure and Program, Study of Algorithms; Pseudo-
code Conventions; Recursive Algorithms –Space and Time Complexity –
Recurrence Relations and Recurrence Trees for Complexity Calculations;
Profiling. –Deterministic and non - deterministic algorithms.

Module 2 Divide and Conquer
Control Abstraction, Finding Maximum and Minimum, Binary Search, Divide
and Conquer Matrix Multiplication, Stressen’s Matrix Multiplication, Merge Sort,
Quick Sort.

Module 3 Greedy Strategy
Control Abstraction, General Knapsack Problem, Optimal Storage on Tapes, Minimum Cost Spanning Trees – Prim’s Algorithm, Kruskal’s Algorithm – Job sequencing with deadlines.

**Module 4  Dynamic Programming**

Principle of Optimality, Multi-stage Graph, All-Pairs Shortest Paths, Travelling Salesman Problem.

**Lower Bound Theory** - Comparison Trees for Searching and Sorting, Oracles and Adversary Arguments – Merging, Insertion & Selection Sort; Selection of ‘$k^{th}$’ Smallest Element.

**Module 5  Backtracking**

Control Abstraction - Bounding Functions, Control Abstraction, N-Queens Problem, Sum of Subsets, Knapsack problem.

**Branch and Bound Techniques** – FIFO, LIFO, and LC Control Abstractions, 15-puzzle, Travelling Salesman Problem.

**Text Book**

1. Fundamentals of Computer Algorithms - Horowitz and Sahni, Galgotia

**References**

2. Data Structures algorithms and applications - Sahni, Tata McGRHill
4. Introduction to algorithm- Thomas Coremen, Charles, Ronald Rivest -PHI

**SYSTEM SOFTWARE LAB**

R607 0+0+4

1. Symbol table construction
2. Single pass and two pass assembler.
3. Macro processor module binder (with limited Instruction set)
4. Lexical analyzer.
5. Bottom Up and Top Down Parser.

Any experiment according to the syllabus of RT505 can be substituted.
The aim of the mini project is to prepare the students for the final year project. The topic for the mini project should be simple as compared to the main project, but should cover all the aspects of a complete project.
SEVENTH
SEMESTER
Module 1


Module 2

**Dynamic modeling:** Events and states – Operations – Nested state diagrams – Concurrency – Advanced dynamic modeling concepts – A sample dynamic model – Relationship of Object and Dynamic models.


Module 3

**Analysis:** Analysis in object modeling, dynamic modeling and functional modeling, Adding operations- Iterating the analysis

**System Design:** Breaking system into subsystems - Identifying concurrency-allocating subsystems to processors and tasks, managing of data stores. Handling of global resources- handling boundary conditions-Common Architectural Frameworks

Module 4

**Object Design:** Overview of Object design – Combining the three models – Designing algorithms – Design optimization – Implementation of control – Adjustment of inheritance - Design of association – Object representation – Physical packaging – Documenting design decisions-Comparison of methodologies

Module 5


**Text Book**

1. Object Oriented Modeling and Design -JamesRumbaugh, Prentice Hall India
2. Object Oriented Analysis and Design with Applications - Grady Booch, Pearson Education Asia
References

1. Object Oriented Software Engineering - Ivan Jacobson, Pearson Education Asia
2. Object Oriented Software Engineering - Berno Bruegge, Allen H. Dutoit, Pearson Education Asia
4. Succeeding with the Booch OMT Methods -A practical approach - Lockheed Martin, Addison Wesley
5. UML and C++ practical guide to Object Oriented development - Richard C.Lee & William, Prentice Hall India

COMPUTER GRAPHICS

Module 1


Module 2

**2D Graphics:** Line drawing algorithms – DDA, Bresenham’s – Bresenham’s Circle drawing algorithm - 2D Transformations, Clipping – Line clipping – Polygon Clipping, Windowing.

Module 3

**3D Graphics:** 3D display methods, 3D Object Representation – Polygon Surfaces – Quadratic surfaces – Spline Representations – Bezier Curves and Surfaces – B-Spline Curves and Surfaces, 3D Transformations.

Module 4


Module 5

**Advanced Technologies:** Fractals – Classification of Fractals – Self-Squaring Fractals, Animation- Raster Animation, Morphing.
Text Book

1. Computer Graphics (C version) - Donald Hearn & Pauline Baker (Pearson Education Asia)

References

4. Fundamentals of Computer graphics & multimedia- D. P. Mukherjee, Prentice Hall of India

THEORY OF COMPUTATION 3+1+0

Module 1

Module 2

Module 3

Module 4
Turing Machines – Formal definition – Language acceptability – Universal Turing Machines – Halting Problem of Turing Machines – Church’s Thesis - Godelization.

Module 5

References

1. Introduction to the Theory of Computation- Michael Sipser, Brooks/Cole (Thomson Learning)
3. Elements of the theory of computation -Harry R Lewis, Christos H Papadimitriou Prentice Hall of India / Pearson Education Asia
4. The Theory of Computation - Bernard M Morct (Pearson Edn)
5. Introduction to Automata Theory, Languages & Computation John Hopcroft, Rajeev Motwani & Jeffry Ullman (Pearson Edn)

ADVANCED SOFTWARE ENVIRONMENT

Module 1

Module 2

Module 3

Module 4
Module 5

References
Module 1, 2
1. Visual C++ Programming - Yashwanth Kanetkar (BPB)

Module 3, 4
5. COM & CORBA side by side – Janson Pritchard, Pearson Education Asia

Module 5
6. X-Windows system programming – Nabajyoti Barkakati (2nd Edition), Prentice Hall of India

WEB TECHNOLOGIES
RT 705 2+1+0

Module 1

Module 2
Document Type declarations – Creating XML DTDs – Element type declaration – Attribute List Declaration – Attribute types – Attribute defaults – Displaying XML Data in HTML browser as HTML tables – Storing XML data in HTML document – Converting XML to HTML with XSL minimalist XSL style sheets – XML applications

Module 3
Module 4

Module 5

References

Module1, 2
1. XML by Example: Building Ecommerce applications - Sean McGrath, Pearson Education Asia

Module3
3. Programming Black Book - Steven Holzner, Wiley Dreamtech

Module4
5. JSP: Java server pages - Barry Burd, IDG Books India

Module 5
7. EJB Design Patterns - Floyd Marinescu

Additional Reference
8. Internet & Web Technologies - Raj Kamal, TMH

ELECTIVE - I
R706 3+1+0

List of electives
1. Optimization Techniques
2. Operating System Kernal Design
3. Principles of Real Time Systems
4. Windows Programming
5. Mobile Computing
6. Software Architecture
7. Lan Technology

Note
New Electives may be added according to the needs of emerging fields in technology. The name of the elective and its syllabus should be submitted to the university before the course is offered.

OPTIMIZATION TECHNIQUES (ELECTIVE - I)
CMELRTA 706-1 3+1+0

Module 1: Classical optimization techniques

Module 2: One-dimensional unconstrained minimization

Module 3 Unconstrained minimization

Module 4 Integer – Linear programming problem
Gomory’s cutting plane method – Gomery’s method for all integer programming problems, mixed integer programming problems.

Module 5 Network Technique
Shortest path model - Dijkstra’s Algorithm Floyd’s Algorithm – minimum spanning tree problem – PRIM algorithm – Maximal Flow Problem algorithm

References
1. Optimization theory and application - S.S. Rao, New Age International P. Ltd.
5. Operation Research – R. Pannerselvam, PHI

OPERATING SYSTEM KERNEL DESIGN (ELECTIVE - I)
Module 1

Module 2
Synchronization in kernel – Synchronization techniques - Interprocess communication using semaphores, messages and shared memory

Module 3
Memory Management – The architecture independent memory model in Linux – memory pages – Virtual address space and linear address calculation – Virtual address space for a process – User segment – Virtual memory areas – Kernel Segment – Memory allocation in kernel segment – Block device caching mechanisms in Linux – paging – Page cache and management – handling page faults.

Module 4
The ext2 File system – Directories in ext2 – block allocation and addressing - extensions in ext2 file system

Module 5
Device drivers – Character and block devices – polling – interrupt sharing – implementing a device driver for PC speaker

References
1. Linux Kernel Internals 2nd edition – Beck (Pearson Education Asia)
2. Understanding the Linux Kernel - Daniel P Bovet and Marco Cesati (O’Reilly)
3. Linux Device Drivers – Rubini A. (O’Reilly)
4. Operating System Concepts - Silbershatz and Galvin (John Wiley)
7. Unix Internals Then New Frontiers – Vahalia U (PHI)
8. Red Hat Linux 7.1 Bible – Christofer Negus (IDG Books)
PRINCIPLES OF REAL TIME SYSTEMS (ELECTIVE - I)

RT706-3 3+1+0

Module 1
Introduction to Real Time Systems – Structure of real time systems, real time computer, task classes – Periodic, Aperiodic, critical, Non-critical, definition of real time systems – real time systems, embedded systems - Hard real time systems, soft real time systems, real time design issues.

Module 2

Module 3
Communication – Communication Media and message sending topologies, network architecture issues, protocols – contention – based, token - based, stop and go multiloop, polled bus, hierarchal, round robin, fault tolerant routing – clocks and synchronization – fault tolerant synchronization in hardware, synchronization in software.

Module 4

Module 5
Programming Languages – Desired language characteristics, Real time databases, characteristics, main memory databases, Transaction, Disk schedule algorithms, Databases for hard real time systems, maintaining serialization constituency.

Text Book

References
1. Real Time Systems, Design & Analysis - Philip Laplante (IEEE)

WINDOWS PROGRAMMING (ELECTIVE - I)
Module 1
Introduction - Concepts of Windows Programming - Event Driven Programming
– Languages that support Windows Programming – Visual Basic – Java – Visual C++
Visual Basic Programming: Basic Language features – Variables, data types, constants, control statements – Forms – Creating and Using basic Controls – text boxes, labels, buttons - Event handling procedures – Properties Window – Common properties for Controls. Message boxes

Module 2
Visual Basic Programming (Contd) Standard Controls – List boxes, Comboboxes, Image box, picture box, Shape controls, Timer, Scrollbars, Frames, Checkboxes, Option Boxes – Frames - File, Drive and Directory List boxes.- MDI and SDI interfaces – Menus

Module 3
ActiveX controls - RichTextBox, Tree View Control, List view Control, Progressbar, Flexgrid Control, Common dialog Controls – Font, File, Print Dialogs – Creating Custom activex controls – Creating Events and properties for ActiveX controls.

Module 4

Module 5
Database Access – Using DAO, RDO and ADO for accessing databases – Creating tables, inserting, deleting and updating records – Using the Data Control – Using the ADO Data Control

References
MOBILE COMPUTING (ELECTIVE - I)

Module 1
Introduction: - Short History, Mobile telephone systems

Module 2

Module 3
Location Management, Addressing, Access Point Control Protocol (APCP).

Module 4
Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Transmission.

Module 5
Wireless Application Protocol & World Wide Web
WWW- HTTP, Usage of HTML, WWW system architecture.

Text Book
1. Mobile Communications – Jochen Schiller, Preason Education Asia

References

1. Computer Networks – Andrew S. Tanenbaum, PHI

SOFTWARE ARCHITECTURE (ELECTIVE - I) 3+1+0

Module 1

Module 2
Shared Information Systems – Integration in software Development Environment – Integration in the design of Buildings – Architectural structures for shared information systems

Module 3
Guidance for user interface architecture Quantified design space – Formal models and specifications-The value of architectural formalism – Formalizing the architecture of a specific system – Formalizing the architectural style – Formalizing an architectural design space

Module 4
Linguistic issues - Requirements for architecture – Description languages – first class connectors – Adding implicit invocation to factorial processing languages.

Module 5
Tools for architectural design – Unicon – Exploiting style in architectural design environments – Architectural interconnection

Reference

1. Software Architecture – perspectives on an emerging discipline - Mary Shaw, David Garlan, PHI

LAN TECHNOLOGY (ELECTIVE - I) 3+1+0

Module 1
Classification of LAN - Life cycle of LAN- Models for Communication - Topology - LAN standards - IEEE 802.2 LLC, IEEE 802.x MAC, FDDI.

Module 2

Module 3
Traditional interconnection components – Repeater, Bridges, Routers, Network interface cards, Types of switch, port switching & segment switching – combined speed – Hubs.

Module 4

Module 5

Text Book
1. Local area networks: Management, Design & security- Arne Mikalsen Per Borgesen – WILEY- dreamtech
2. Local Area Network - S. K. Basandra, S. Jaiswal

References
1. Local Area Networks - John E McNamara
2. Understanding Local Area Network- Stan Schutt – PHI
8. Introduction to Local Area Networks- Robert M. Thomas – BPB
9. LAN- Peter Hodson – BPB
10. LAN- Gerd E. Kerser – McGraw Hill
COMPUTER HARDWARE AND NETWORKING LAB

R707                  0+0+3

Familiarisation with PC Components

1. Diagnostic S/Ws, Cards, Design & Programming of add-on cards familiarisation with device drivers, Micro controllers etc.
2. Experiments for communication with peripheral devices using C and MASM.
3. Experiments for serial and parallel port communication using C and MASM.
4. Familiarisation with network configuration (routing, DNS, File Servers etc...)
5. Lan trouble shooting, Network problems and recovery, Network diagnostics softwares.

References
1. Upgrading & Repairing PC’s - Scott Muller (PHI)
2. Red hat Linux Bible- Cristofer Negas (IDG Books)
3. TCP/IP Bible –Rob Scringer (IDG Books)

NETWORK PROGRAMMING LAB

R708                  0+0+3

Experiments using interprocess communication and Network communication, synchronisation & IPC using semaphore, pipe & messages.

Programs for FTP and socket based chat.
Implementation of File Transfer - Communication through serial port - Communication through TCP/IP port

Efficient error checking algorithms (Eg: CRC)

Remote Procedure Call, Remote Method Invocation.

Programs with HTML, DHTML, Applets, Java Script, Java, XML, Java Beans, JSP and EJB.

Any experiments according to the syllabus of RT604 Computer Networks, RT605 Network Computing and RT705 Web Technologies may be substituted

References
1. UNIX Network programming - Stevens. (PHI)
2. Using Java2 Platform – Weber (AWL)
Each student is required to present a technical paper on subject approved by the department. The paper should in general reflect the state of the art. He/She submits a report of the paper to the department.

In addition to the seminar He/She shall undertake a project work in the 7th semester itself in consultation with the guide(s). On completion of the project work, He/She shall present the work done before a panel of staff members, and submit a report of the project work done to the department.
EIGHTH SEMESTER
Module 1

Module 2
OS Security – Protection Mechanisms – Authentication & Access control – Discretionary and Mandatory access control – Authentication mechanisms – Official levels of computer security (DoD) - Security breaches – Concept of a hole - Types of a holes – Study of the security features for authentication, access control and remote execution in UNIX, WINDOWS 2000

Module 3

Module 4

Module 5

Text Books
1. Module1, 4 Network Security Essentials Applications & Standards, William S., Pearson Education Asia
2. Module2 Modern operating System, Andrew S. Tanenbaum, Pearson Education Asia
5. Information theory coding and cryptography, Ranjan Bose, TMH
6. Module 4.5 Designing security Architecture Solutions, Jay Ramachandran, Wiley Dreamtech

References

2. Database Security Mechanisms for Computer Network- Sead Muftic, John wiles
4. Firewalls Complete - Marcus Gonsalvus, TMH
5. Networking Technologies - Jaisal, Galgotia Publication
7. Mastering JAVA security; Cryptography, Algorithms and Architecture - Rich Helton, Wiley Dreamtech
8. Implementing IPv6- Mark A. Miller P.E, IDG Books

HIGH PERFORMANCE COMPUTING

Module 1
Introduction to parallel processing - Trends towards parallel processing - Parallelism in uniprocessor - Parallel computer structures-Architecture classification schemes - Indian contribution to parallel processing.

Module 2
Principles of pipelining and vector processing - Linear pipelining - Classification of pipeline processors - General pipelines - Instruction and Arithmetic pipelines – Design of Pipelined instruction unit-Principles of Designing Pipeline Processors-Instruction prefetch and branch handling- Dynamic pipelines - Architecture of Cray-1.

Module 3
Array processors - SIMD array processors - Interconnection networks - Static vs dynamic networks - mesh connected networks - Cube interconnection networks - Parallel algorithms for array processors - SIMD matrix multiplication-Parallel sorting on array processors - Associative array processing - Memory organization.

Module 4
Multiprocessor architectures and Programming - Loosely coupled and Tightly coupled multiprocessors - Interconnection networks - Language features to exploit parallelism - Process synchronisation mechanisms.

Module5
Dataflow computers - Data driven computing and Languages - Data flow computers architectures - Static data flow computer - Dynamic data flow computer - Data flow design alternatives.

Text Book


References

1. Elements of Parallel computing - V. Rajaraman - PHI
2. Super Computers - V. Rajaraman - Wiely arstern

PRINCIPLES OF PROGRAMMING LANGUAGES

R803 3+1+0

Module1

Module2
Data types - Specification of data types, implementation of elementary data types, Declarations, type checking and type conversion - Assignment and Initialisation - Structured data types - Specification of data structure types, Implementation of data structure type - Declarations and type checking for data structures.

Module 3
Abstract data types, Encapsulation by subprogram - Type definition, storage management - Sequence Control - Implicit and Explicit sequence control, sequencing with arithmetic expressions, sequence control between statements.

Module 4
Subprogram control - Subprogram sequence control, attributes of data control, Shared data in subprograms - Abstract data types revisited, Inheritance, Polymorphism.
Module 5
Advances in Language design - Variations of subprogram control, Parallel programming, Introduction to exception handling - Exception handling in JAVA, Hardware developments, software architecture.

Text Book

1. Programming Languages, Design & Implementation - Terrence W. Pratt, Marvin V. Zelkowitz., Pearson Education Asia / Prentice Hall of India

Reference

1. Programming Languages - Robert W Sebesta, Pearson Education Asia

ARTIFICIAL INTELLIGENCE

RT 804 3+1+0

Module 1

Module 2

Module 3
Game playing and knowledge structures – Games as search problem – Imperfect decisions – Evaluation functions – Alpha – Beta pruning – state of art game programs, Introduction to frames and semantic nets.

Module 4

Module 5

Text Books

Module 1,2,3,4
1. Artificial Intelligence – A modern approach, Stuart Russell – Peter Narang, Pearson Education Asia

Module 5
3. Artificial Intelligence, George F Luger, Pearson Education Asia

References
1. An Introduction to Artificial Intelligence – Eugene Charniak & Drew McDermot, Pearson Education Asia

ELECTIVE - II
R805 3+1+0

List of electives
1. Advanced Mathematics
2. Client-Server Computing
3. E-Commerce
4. Analysis and Modeling of Digital Systems
5. Distributed Computing
6. User Interface Design

Note
New Electives may be added according to the needs of emerging fields in technology. The name of the elective and its syllabus should be submitted to the university before the course is offered.

ADVANCED MATHEMATICS (ELECTIVE - I)
CMELR 805-1 3+1+0

Module 1  Green’s Function
Module 2  Integral Equations
Definition of Volterra and Fredholm Integral equations – conversion of a linear differential equation into an integral equation – conversion of boundary value problem into an integral equation using Green’s function – integral equation with separable Kernels – Integral equations of convolution type – Neumann series solution.

Module 3  Gamma, Beta functions

Module 4  Power Series solution of differential equation
The power series method – Legendre’s Equation – Legendre’s polynomial – Rodrigues formula – generating function – Bessel’s equation – Bessel’s function of the first kind – Orthogonality of Legendre’s Polynomials and Bessel’s functions.

Module 5  Numerical solution of partial differential equations.
Classification of second order equations- Finite difference approximations to partial derivatives – solution of Laplace and Poisson’s equations by finite difference method – solution of one dimensional heat equation by Crank – Nicolson method – solution one dimensional wave equation.

References

CLIENT SERVER COMPUTING (ELECTIVE - II) 3+1+0

Module 1  Introduction
Module 2  Design
Fundamentals of client server design - Managing the interaction of client and server - Communications Techniques protocols & Client server interaction protocols - Preparing applications for client server - Optimizing applications for client server - Example client server implementations - Request acceptance dispatching - Execution of requests - Client server interaction using message.

Module 3  Multitasking
Multi programming vs multitasking - Processor - Advantages and draw backs of multiple processor - Child and parent processor - Case study Novell Netware and Windows NT - Developing server applications - Threads - Server communication model.

Module 4  Synchronization
Scheduling implementations - processing queues - context switching pre emptive systems - critical sections - mutual exclusion - semaphores - semaphore implementations in NT & Netware.

Module 5  Communications
Network communication - Inter process communication - Building portable client server applications.

References

3. Developing Client Server Applications - W.H.Inman, BPB.
5. Client Server Strategies- David Vaskevitch, Galgotia.

E-COMMERCE (ELECTIVE - II)  
R805-3  3+1+0

Module 1  Introduction to Electronic Commerce

Module 2  Network Security

**Module 3  Electronic Payment Systems**
Types of Electronic Payment Systems, Digital Token Based Electronic Payment System, Smart Cards, Credit Cards, Risk in Electronic Payment Systems, Designing Electronic Payment Systems.

**Module 4  Electronic Data Interchange**

**Module 5  Recent Trends in E-Commerce**

**Text Book**
1. Frontiers of Electronic Commerce - Ravi Kalakota & Andrew B Whinston, Pearson Education Asia

**References**
2. E- Commerce The cutting edge of Business - Kamlesh K Bajaj & Debjani Nag
3. E-Commerce - Strategy, Technologies and Applications, TMH

**ANALYSIS AND MODELING OF DIGITAL SYSTEMS (ELECTIVE - II)**

**RT805-4**

**Module 1**

**Module 2**
Basic language concepts simulation: signals – Entity architecture – concurrent statements – Constructing VHDL models using CSAs – delays.
Synthesis: Interface from declarations, simple CSA statements, conditional signal assignment statements, and selected signal assignment statements.

Module 3

Module 4

Module 5

Text Book
1. Introductory VHDL - Sudhakar Yalamanchili, Pearson Education Asia.

References
1. VHDL primer - J Bhaskar, Pearson Education Asia

DISTRIBUTED COMPUTING (ELECTIVE - II)
RT805-5 3+1+0

Module I  Introduction
Introduction to Distributed Systems, evolution, characteristics, design issues, user requirements, Network technologies and protocols – overview, MACH, AMOBEA- overview.

Module 2  Distributed file system
File service components, design issues, interfaces, implementation techniques, Sun Network File System – architecture and implementation, other distributed file systems – AFS, CODA. Name services – SNS name service model.

Module 3 Communication in distributed systems
Client server communication, Group communication, Message passing – features, synchronizations, RPC – model, implementation, stub generation, messages, marshalling, Server management. Distributed shared memory – Architecture, design issues, structure of shared memory space, replacement strategy, thrashing. Synchronization – clock synchronization, event ordering, mutual exclusion

Module 4 Resource and Process management
Features of scheduling algorithms, Task assignment approach, load balancing, load sharing, Process migration mechanisms, Threads – scheduling.

Module 5 Consistency maintenance

References
1. Distributed Systems – Concepts and designing - George Coulouris, Jean Dellimore, Tim Kindberg - Pearson Education Asia
2. Distributed Operating Systems - Andrew S. Tenenbaum Pearson Education Asia

USER INTERFACE DESIGN (ELECTIVE - II)

Module 1 Introduction
Importance of user interface – definition, importance of good design, brief history – Graphical User Interface – Web User Interface – Principles of User interface design.

Module 2 Design Process
Human Interaction with computers, Importance of Human Characteristics, Human consideration, Human Interaction speeds – Understanding Business function

Module 3 Screen Designing
Design goals - screen meaning and purpose, organizing screen elements- ordering of screen data and content – screen navigation and flow – visually pleasing composition – amount of information – focus and emphasis – presenting
information simply and meaningfully – information retrieval on web – Statistical graphics – Technological considerations in Interface Design.

**Module 4  Windows and components**
Menus and navigation schemes, selection of windows, Selection of device based and screen based controls - text and messages – icons and images – Multimedia – colours- uses, problems, choosing colours.

**Module 5  Software tools**
Specification methods, interface building tools

**Text Book**
2. Designing the User Interface 3rd Edn. – Ben Shneiderman, Pearson Education Asia

**References**
2. The Essentials of User Interface Design - Alan Cooper, Wiley Dreamtech

**ELECTIVE - III**

R806 3+1+0

**List of electives**
1. Multimedia Systems
2. Embedded Systems
3. Neural Networks
4. Genetic Algorithms and Applications
5. Advanced Networking Trends
6. Data Processing and Analysis Techniques
7. Biometrics

**Note**
New Electives may be added according to the needs of emerging fields in technology. The name of the elective and its syllabus should be submitted to the university before the course is offered.
Module 1  Introduction
Definition of multimedia, multimedia, hardware, software applications and software environments - Media Types - Analog and digital video, digital audio, music and animation - Analog & Digital video - Memory storage - Basic tools - Authoring tools.

Module 2  Building Blocks
Text - Hyper text - Sound - Sound cards - Standards - Image - Image types - Image compression, RLE, JPEG, MPEG - Fractal and Wavelet Compressions - Image file types - Animation - Capture and Playback techniques. (basic ideas only)

Module 3  Multimedia Environments
The Compact Disc family, CD-interactive, Digital Video Interactive, QuickTime, Multimedia PC and Microsoft Multimedia Extensions.

Module 4  Multimedia Programming
Framework: Overview, Media classes, Transform classes, Format classes and Component classes - Problems related to programming - Composition, Synchronisation, Interaction, Database integration.

Module 5  Advanced Multimedia

References
3. Authoring Interactive multimedia - Arch C Luther
4. Optimizing your Multimedia PC - L.J. Skibbe, Susan Lafe Meister - Comdex
5. Multimedia Bible - Winn L. Rosch, Sams
6. Multimedia Producers Bible - Ron Goldberg, Comdex
9. Integrated Multimedia Systems Overview - Palikom, The communication Wall
Module 1  Overview of Embedded System

Module 2  Embedded Hardware & Software Development Environment
Hardware Architecture, Micro-Controller Architecture, Communication Interface Standards, Embedded System Development Process, Embedded Operating systems, Types of Embedded Operating systems.

Module 3  Embedded Communication System

Module 4  Real Time & Database Applications

Module 5  Java Applications & Future Trends in Embedded Systems

Text Book
1. Programming for Embedded Systems- Dreamtech Software Team, Wiley Dreamtech

Reference
NEURAL NETWORKS (ELECTIVE - III)

Module 1

Module 2

Module 3
Counter Propagation networks: Keennon layer - Training the cohenen layer - Pre initialising the wright vectors - statistical properties - Training the Grosbery layer - Full counter propagation network - Application.

Module 4
Statistical methods - Boltzmann’s Training - Cauche training - Artificial specific heat methods - Applications to general non-linear optimization problems.

Module 5

Text Book

1. Neural Computing Theory & Practice - Philip D. Wasserman.

References

1. Neural Networks - Simon Haykins
2. Adaptive Pattern Recognition & Neural Networks - Pay Y.H.
3. An Introduction to neural computing - Chapman & Hall
5. Artificial Neural Networks - B.Yegnanarayana, PHI

GENETIC ALGORITHMS AND APPLICATIONS (ELECTIVE - III)

Module 1 Architecture-Altering Operations

Module 2 Genetic Programming Problem Solver (GPPS)
Elements of GPPS 1.0-Problems Illustrating GPPS 1.0 - Elements of GPPS 2.0 - Problems Illustrating GPPS 2.0 - Previous Work on Automated Analog Circuit Synthesis.

Module 3 Automated synthesis of analog electrical circuits
Synthesis of a Low-pass Filter and High-pass Filter The Role of Crossover in Genetic Programming.

Module 4 Evolvable Hardware
Evolvable Hardware and Rapidly Re-configurable Field-Programmable Gate Arrays
Discovery of cellular Automata Rules: Discovery of a Cellular Automata Rule for the Majority Classification Problem.

Module 5 Programmatic Motifs for molecular Biology
Automatic Discovery of Protein Motifs –Programmatic Motifs and the Cellular Location Problem.

Text Book


Reference


ADVANCED NETWORKING TRENDS (ELECTIVE - III)
RT806-5 3+1+0

Module 1

Module 2
ISDN - Definition - Protocol architecture - System architecture - Transmission channels - ISDN interface, B-ISDN.

Module 3

Module 4
SATELLITE COMMUNICATION: Satellite communication principles - Geo stationary satellites - block schematic of satellite earth station - VSAT - VSAT networks - applications in personnel communication. (basic ideas only)

Module 5

References

Module 1

Module 1,2,3
2. Mobile Communication - Jochen Schiller, Pearson Education Asia

DATA PROCESSING AND ANALYSIS TECHNIQUES (ELECTIVE - III)
RT806-6 3+1+0

Module 1
Introduction to COBOL programming -elements of COBOL divisions, sections and paragraphs -Table writing - complete program in COBOL using various options verbs, statements- conditional statements.

Module 2
Table Handling – Occur clause – PERFORM verb – SET verb, SEARCH verb – Occurs depending clause – Sorting a Table.
Module 3

Module 4

Module 5

References
1. COBOL programming - M K Roy & D Ghosh Dastidar, Tata McGraw Hill
3. Data mining Concepts and Techniques - Jawei Han & Micheline Kamber (Morgan Kunfmann Pub.)
4. Data Mining - Pieter Adriaans, Dolf Zantinge, Person Education Asia

BIOMETRICS (ELECTIVE -III) 3+1+0

Module 1

Module 2
Finger scan – features – components – operation (steps) – competing finger scan technologies – strength and weakness
Facial scan - features – components – operation (steps) – competing facial scan technologies – strength and weakness

Module 3
Iris scan - features – components – operation (steps) – competing iris scan technologies – strength and weakness
Voice scan - features – components – operation (steps) – competing facial scan technologies – strength and weakness

Module 4
Other physiological biometrics-Handscan-retina scan- AFIS (automatic fingerprint Identification systems)-Behavioral Biometrics-Signature scan-Key stroke Scan.

Module 5
Biometrics Application – Biometric Solution Matrix-Bioprivacy-Comparison of privacy factor in different biometrics technologies-Designing privacy sympathetic biometric systems-Biometric standards- (BioAPI, BAPI)-Biometric middleware.

Reference
1. Biometrics -Identify Verification in a Networked World - Samir Nanavati, Michael Thieme, Raj Nanavati- WILEY-dreamtech

GRAPHICS AND MULTIMEDIA LAB
R807 0+0+4

Point plotting, line and circle drawing, Line and Polygon clipping, transformations, hidden line elimination, curves, polygon hatching, Multimedia programming, Visual programming, Animation

Any experiment according to the syllabus of R702 Computer Graphics may be substituted

PROJECT & SEMINAR
R709/ R808 0+0+4

Each student is required to present a technical paper on subject approved by the department. The paper should in general reflect the state of the art. He/ She submits a report of the paper to the department.

In addition to the seminar He/She shall undertake a project work in the 7th semester itself in consultation with the guide(s). On completion of the project work, He/She shall present the work done before a panel of staff members, and submit a report of the project work done to the department.

VIVA -VOCE
R809
A comprehensive Viva-voce examination will be conducted to assess the students overall knowledge in the specified field of engineering. At the time of Viva-voce, certified report of seminar, mini project and project work are to be presented for evaluation.