MAHATMA GANDHI UNIVERSITY

B.TECH. DEGREE COURSE

4TH SEMESTER

SCHEME & SYLLABUS

2002

COMPUTER SCIENCE & ENGINEERING BRANCH
## COMPUTER SCIENCE & ENGINEERING

### SCHEME

#### 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>
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<td>Engineering Mathematics III</td>
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SYLLABUS

ENGINEERING MATHEMATICS - III

CMELRPTA 401                3+1+0

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
R 402

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
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

R404
3+1+0

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

Module 2
Storage elements - Flip flops - Latches - Registers, Decoders, Multiplexers-
Buffers - Memory systems - ROM types - RAM - BJT RAM cells - MOS RAMs,
RAM organization - flash memories - PLA - PAL - PGA - FPGA - PLD - CPLD -
CDROM - Magneto optic storage.

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

R 405
3+1+0

Module 1
Principles of programming – System Life Cycle - Algorithm Specification-
Recursive Algorithms- Documentation- Performance Analysis and
Measurements- Time and Space complexity-Complexity calculation of simple
algorithms.
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
Module 1
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.
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.