

**MAHATMA GANDHI
UNIVERSITY**

B.TECH. DEGREE COURSE

3rd SEMESTER

**SCHEME
&
SYLLABUS**

2002

**COMPUTER SCIENCE
&
ENGINEERING BRANCH**

COMPUTER SCIENCE & ENGINEERING

SCHEME

3RD SEMESTER

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

SYLLABUS

ENGINEERING MATHEMATICS - II

RT301

3+1+0

Module 1

Mathematical Logic - Statements, connectives - Well formed formulas - Tautologies - 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 – Euclid's 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

1. Elements of Discrete Mathematics - C.L.Lieu, McGraw Hill.
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

MICROPROCESSOR SYSTEMS

R302

3+1+0

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

Subroutines - Stack Operations - Call Return sequence- Programming Examples. CPU of a microcomputer – timing and control unit – The fetch operation – Machine cycle and T- State instruction and data flow.

Module 4

Interrupts of 8085 - Hardware & Software Interrupts – Enabling, Disabling and masking of interrupts – Polling – HALT & HOLD states – Programmable interrupt controller – 8259

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
2. Pulse Digital and Switching wave forms - Millman and Taub, McGraw Hill
3. Electronics Devices & Circuits - Boylestad & 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

Module2

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 - Kernighan & Ritchie, PHI
2. Programming with ANSI and Turbo C - Ashok N. Kamthan, Pearson Education
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
9. C Programming - A Modern Approach - K.N. Iling W.W. Norton & Company Newyork
10. Structured and Object Oriented Problem Solving using C++ - Andrew C Staugaard Jr., PHI

HUMANITIES

RT305

2+1+0

PART A: PRINCIPLES OF MANAGEMENT

Module 1

Scientific Management – Evolution of management theory – Contributions of Taylor, Gilbreth, Gantt, Emerson – Definition and functions of management – Authority, Responsibility, Delegation and Span of control – Types of structures of Organisation – Types of Business firms – Job evaluation and merit rating – Wages – Types of incentives.

Module 2

Procedure for ISO and ISI certification – Design, Development and implementation of re-engineering – Inspection – SQC control charts – quality assurance – TQM – Zero defects.

PART B: ENGINEERING ECONOMICS

Module 3

The Indian financial system – Reserve bank of India – functions – commercial banking system – profitability of public sector banks – development financial institutions – IDBI, ICICI, SIDBI, IRBI – Investment institutions – UTI, Insurance companies – The stock market – functions – Recent trends.

Module 4

Indian Industries – Industrial pattern – structural transformation – industrial growth – inadequacies of the programme of industrialization – Large and small scale industries – industrial sickness and government policy – industrial labour – influence of trade unions.

Module 5

The tax framework – Direct and Indirect taxes – Impact and incidence – Progressive and regressive – functions of the tax system – Black money – magnitude and consequences – Public debt – Debt position of the central and state governments – Deficit financing – revenue deficit and fiscal deficit – Problems associated with deficit financing.

References

1. Management- Stoner, Freeman and Gilbert, PHI
2. Engineering Management- Mazda, Pearson Education
3. Indian Economy - Ruddar Datt, S Chand and Company Ltd.
4. Indian Economy – Problems of Development and Planning - A. N. Agarwal, Wishwa Prakashan.

LOGIC SYSTEM DESIGN

R306

3+1+0

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

Postulates of boolean algebra - basic theorems - Logic functions - truth tables - canonical forms - SOP, POS - methods of minimization of logic functions - K maps & quine mccliskey method - realization using logic gates - NAND NOR gates - universal gates - don't care combinations - formation of switching function - from word statements.

Module3

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.

Module4

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
2. Logic and Computer Design – M. Moris Mano, Charles R. Kime Pearson Education
3. Switching & finite automata theory - Zvi Kohavi, Tata McGraw Hill
4. Digital computer fundamentals - Thomas C. Barteo, Tata McGraw Hill.
5. Digital Computer Design - Malvino, Tata McGraw Hill.
6. Digital Design - Morris Mano, Pearson Education
7. Digital Design Principles & Practice – John F. Wakerly, Pearson Education

SOLID STATE ELECTRONICS LAB

R307

0+0+4

1. Characteristics of Silicon, Germanium, Zener diodes.
2. Characterisctics 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

R308

0+0+4

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. Progrmming 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.