EN010301 B Engineering Mathematics II

(CS, IT)

Teaching scheme **Credits: 4**

2 hours lecture and 2 hour tutorial per week

Objectives

- *To know the importance of learning theories and strategies in Mathematics and graphs.*

MODULE 1 Mathematical logic (12 hours)

Basic concept of statement , logical connectives, Tautology and logical equivalence – Laws of algebra of propositions – equivalence formulas – Tautological implications (proof not expected for the above laws , formulas and implications). Theory of inference for statements – Predicate calculus – quantifiers – valid formulas and equivalences – free and bound variables – inference theory of predicate calculus

MODULE 2 Number theory and functions (12 hours)

Fundamental concepts – Divisibility – Prime numbers- relatively prime numbers – fundamental theorem of arithmetic – g.c.d - Euclidean algorithm - properties of gcd (no proof) – l c m – Modular Arithmetic – congruence – properties – congruence class modulo n – Fermat's theorem – Euler's Totient functions - Euler's theorem - Discrete logarithm

Function – types of functions – composite functions – inverse of a function – pigeon hole principles

MODULE 3 Relations (10 hours)

Relations – binary relation – types of relations – equivalence relation –partition – equivalence classes – partial ordering relation – Hasse diagram - poset

MODULE 4 Lattice (14 hours)

Lattice as a poset – some properties of lattice (no proof) – Algebraic system – general properties – lattice as algebraic system – sublattices – complete lattice – Bounded Lattice - complemented Lattice – distributive lattice – homomorphism - direct product

MODULE 5 Graph Theory (12 hours)

Basic concept of graph – simple graph – multigraph – directed graph- Basic theorems (no proof) . Definition of complete graph , regular graph, Bipartite graph, weighted graph – subgraph – Isomorphic graph –path – cycles – connected graph.- Basic concept of Eulergraph and Hamiltonian circuit – trees – properties of tree (no proof) - length of tree – spanning three – sub tree – Minimal spanning tree (Basic ideas only . Proof not excepted for theorems)

References

1. S.Lipschutz, M.L.Lipson – Discrete mathematics –Schaum's outlines – Mc Graw Hill
2. B.Satyanarayana and K.S. Prasad – Discrete mathematics & graph theory – PHI
3. Kenneth H Rosen - Discrete mathematics & its Application - Mc Graw Hill
4. H. Mittal , V.K.Goyal, D.K. Goyal – Text book of Discrete Mathematics - I.K. International Publication
5. T. Veerarajan - Discrete mathematics with graph theory and combinatorics - Mc Graw Hill
6. C.L.Lieu - Elements of Discrete Mathematics - Mc Graw Hill
7. J.P.Trembly,R.Manohar - Discrete mathematical structures with application to computer science - Mc Graw Hill
8. B.Kolman , R.C.Bushy, S.C.Ross - Discrete mathematical structures- PHI
9. R.Johnsonbough - Discrete mathematics – Pearson Edn Asia

EN010 302 Economics and Communication Skills

(Common to all branches)

Teaching scheme

2hours lecture and 2 hours tutorial per week **Credits: 4(3+1)**

Objectives

- To impart a sound knowledge of the fundamentals of Economics.

Economics

Module I (7 hours)

Reserve Bank of India-functions-credit control-quantitative and qualitative techniques
Commercial banks-functions- Role of Small Industries Development Bank of India and National Bank for Agriculture and Rural Development
The stock market-functions-problems faced by the stock market in India-mutual funds

Module II (6 hours)

Multinational corporations in India-impact of MNC's in the Indian economy
Globalisation-necessity-consequences
Privatisation-reasons-disinvestment of public sector undertakings
The information technology industry in India-future prospects

Module III (6 hours)

Direct and indirect taxes- impact and incidence- merits of direct and indirect taxes-progressive and regressive taxes-canons of taxation-functions of tax system-
tax evasion-reasons for tax evasion in India-consequences-steps to control tax evasion
Deficit financing-role-problems associated with deficit financing

Module IV (5 hours)

National income-concepts-GNP, NNP, NI, PI and DPI-methods of estimating national income-difficulties in estimating national income
Inflation-demand pull and cost push-effects of inflation-government measures to control inflation

Module V (6 hours)

International trade-case for free trade-case for protectionism
Balance of payments-causes of disequilibrium in India's BOP-General Agreement on Tariffs and Trade-effect of TRIPS and TRIMS in the Indian economy-impact of WTO decisions on Indian industry

Text Books

1. Ruddar Datt, Indian Economy, S.Chand and Company Ltd.
2. K.K.Dewett, Modern Economic Theory, S.Chand and Company Ltd.

References

1. Paul Samuelson, Economics, Tata McGraw Hill
2. Terence Byres, The Indian Economy, Oxford University Press
3. S.K.Ray, The Indian economy, Prentice Hall of India
4. Campbell McConnel, Economics, Tata McGraw Hill

Communication Skills

Objectives

- To improve Language Proficiency of the Engineering students
- To enable them to express themselves fluently and appropriately in social and professional contexts
- To equip them with the components of different forms of writing

MODULE – 1 (15 hours)

INTRODUCTION TO COMMUNICATION

Communication nature and process, Types of communication - Verbal and Non verbal, Communication Flow-Upward, Downward and Horizontal, Importance of communication skills in society, Listening skills, Reading comprehension, Presentation Techniques, Group Discussion, Interview skills, Soft skills

MODULE – II (15 hours)

TECHNICAL COMMUNICATION

Technical writing skills- Vocabulary enhancement-synonyms, Word Formation-suffix, affix, prefix, Business letters, Emails, Job Application, Curriculum Vitae, Report writing-Types of reports

Note: No university examination for communication skills. There will be internal evaluation for 1 credit.

REFERENCES

1. The functional aspects of communication skills, P.Prasad and Rajendra K. Sharma, S.K. Kataria and sons, 2007
2. Communication skills for Engineers and Scientists, Sangeeta Sharma and Binod Mishra, PHI Learning private limited, 2010
3. Professional Communication, Kumkum Bhardwaj, I.K. International (P) House limited, 2008
4. English for technical Communication, Aysha Viswamohan, Tata Mc Graw Publishing company limited, 2008

CS010 303: Problem Solving and Computer Programming

(Common with IT010 306)

Teaching scheme **Credits:** 4

2 hours lecture and 2 hour tutorial per week

Objectives

- *To impart the basic concepts of problem solving using a computer.*
- *To learn about the structure of C programming language.*

Module I (10 hours)

Problem solving: Steps in Computer programming – Features of a good program – Problem solving using Algorithms and Flowcharts.

C fundamentals: Character set, Constants, Identifiers, keywords, basic data types, Variables, Operators, Expressions, Statements, Input and Output statements – Structure of a C program – simple programs.

Module II (13 hours)

Control statements: if, if-else, nested if – switch – while – do-while – for – break & continue – nested loops.

Single dimensional arrays – defining an array, array initialisation, accessing array elements – Programs for sequential search, bubble sort, binary search.

Multidimensional arrays – defining a two dimensional array, array initialisation, accessing elements – Programs for matrix processing.

Module III (12 hours)

Strings: declaring a string variable, reading and displaying strings, string related library functions – Programs for string matching and sorting.

Functions: Function definition, function call, function prototype, parameter passing, void function – Recursion – Passing array to function.

Macros: Defining and calling macros – Difference between macro & function.

Module IV (13 hours)

Structures: defining a structure variable, accessing members, array of structures, passing structure to function.

Unions: difference with structure, defining union variable, accessing members.

Pointers: declaration, operations on pointers, passing pointer to a function, accessing array elements using pointers, processing strings using pointers, pointer to pointer, array of pointers, pointer to array, pointer to function, pointer to structure, self referential structure.

Module V (12 hours)

Files: Different types of files in C – Opening & Closing a file – Writing to and Reading from a file – Processing files – Library functions related to file – fseek(), ftell(), ungetc(), fread(), fwrite() – Dynamic memory allocation.

Storage Class associated with variables: automatic, static, external and register.

Additional features: Enumerated data type, bitwise operators, typedef.

References

1. Programming with C - Byron S. Gottfried, Tata McGraw Hill.
2. Computer Programming in C - Kerninghan & Ritchie, PHI .
3. Programming in C - Stephen C. Kochan, CBS publishers.
4. Programming in C (5e) – E. Balaguruswamy , Mc Graw Hill
5. Let us C – Yashwant Kanetkar, BPB.
6. A Book on C – Al Kelley and Ira Pohl, Addison-Wesley

7. Mastering Turbo C - Stan Kelly Bootle, BPB Publications.
8. Programming and Problem Solving with PASCAL - Micheal Schneider, Wiley Eastern Ltd. (Module 1)
9. Pointers in C - Yashwant Kanetkar, BPB
10. The Spirit of C- by Munish cooper, Jaico Books.

CS010 304: Computer Organization

Teaching scheme **Credits:** 4
3 hours lecture and 1 hour tutorial per week

Objectives

- *To develop a good understanding of a complete computer system through an integrated approach to hardware, software and processor design.*
- *To emphasise on both background theory and actual design.*

Module I (10 hours)

CPU - Arithmetic: Signed addition and subtraction –BCD adder –Multiplication – Array multiplier – Booth's Algorithm, Division – Restoring and non-restoring division.

Module II (12 hours)

Floating-point arithmetic- addition, subtraction, multiplication, division. Decimal arithmetic- addition subtraction, multiplication, division. ALU - design of arithmetic, logical, arithmetic logical unit

Module III (14 hours)

Control Logic Design – Control Organization – Hardware control, Microprogram control (design for specific problems)– Microprogram sequencer, Horizontal and vertical micro instructions.

Module IV (12 hours)

Memory: - Memory hierarchy –Principle of inclusion-memory interleaving techniques. Disk memory - Data organisation on disk-Disk performance –Disk caching. Main memory-SRAM, DRAM, ROM –Associative memory, Scratchpad memory-Cache memory –Levels of Cache-Mapping techniques, Associative, Direct, and Set Associative-Main memory update policies.

Module V (12 hours)

Virtual Memory:-Overlay-Need for virtual memory-Address translation-Translation Look Aside Buffer-Relocation techniques-static, dynamic-Paged memory-Page table, Page frame data table-Segmented memory-Paged segments.

Reference Books

1. M.Morris Mano- *Computer System Architecture*- PHI- Third Edition-2006
2. M.Morris Mano – *Digital Logic and Computer Design* - PHI -2004
3. Carl Hamacher, Zvonko Vranesic, Safwat –*Computer Organization*-McGrawHill-Fifth Edition
4. David A.Patterson,John L.Hennessy-*Computer Organization and Design*-MK-Arm Edition
5. V.Carl Hamacher,Zvonko G. vranesic,Safwat G.Zaky-*Computer Organization*-McGrawHill-Fourth Edition
6. Behrooz parhami-*Computer Architecture*-Oxford University Press
7. Naresh Jotwani-*Computer System Organisation*- McGrawHill

Mahatma Gandhi University

CS010 305 SWITCHING THEORY AND LOGIC DESIGN

(Common with IT010 304)

Teaching scheme **Credits:** 4

3 hours lecture and 1 hour tutorial per week

Objectives:-

To introduce the principles of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Computer Architecture and Design.

Module 1: (14 Hrs)

Number Systems and Codes:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

Switching Theory:- Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions- Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

Module 2: (12 Hrs)

Combinational Logic Circuits:- Review of Basic Gates- Universal Gates,Adders, Subtractors, Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Lookahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and Demultiplexer, PLA and PAL.

Module 3(12 Hrs)

Sequential Logic Circuits:- Latches and Flip Flops- SR, JK, D, T and MS Flip Flops, Asynchronous Inputs.

Clocked Sequential Circuits:- State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

Module 4: (10 Hrs)

Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters , Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

Module 5(12 Hrs)

Fault Tolerance and Diagnosis : Concepts of Fault and Hazards- Fault Tolerance in Combinational Circuits- Fault Table, Fault Detection methods-Boolean Difference and Path Sensitizing Methods-

Digital ICs- Digital Logic Families- Characteristics- Introduction to RTL, TTL,ECL, MOS and CMOS Logics.

Reference Books

1. Zvi Kohavi *Switching and Finite Automat theory*, Tata McGrwHill
2. Morris Mano *Digital Logic and Computer Design* ,Prentice Hall of India
3. Floyd T.L. *Digital Fundamentals* , Universal Bookstall
4. Biswas N.N. *Logic System Theory* Prentice Hall of Inia
5. Leach D. Malvino A.P. & Saha – *Digital Principles and Applications*- Tata McGraw Hill
6. Tau b ,Helbert abd Schilling, *Digital Integrated Electronics* TMH

CS010 306 ELECTRONIC DEVICES AND CIRCUITS

Teaching scheme **Credits:** 4

3 hours lecture and 1 hour tutorial per week

Objectives:-

To introduce the basic principles of various Electronic Circuits, their analysis and Design.

Pre-requisites:

EN010 109 Basic Electronics Engg. & Information Technology

Module 1 (12hrs):-

Transistor Biasing:- Operating Point- DC and AC Load Lines- Q Point selection- Bias Stability- Definition of Stability Factors - Fixed bias, Collector to Base bias , Self bias Circuits, Bias Compensation

Module 2: (12 Hrs)

Transistor as an Amplifier: Transistor at low Frequencies- h Parameter model analysis- Expression of Voltage and Current Gain-Input and Output Impedance.

Tuned Amplifiers:- Principle-Single Tuned and Doubled Tuned Amplifiers- Frequency Response

Module 3: (12 Hrs)

RC Coupled Amplifier:- Working, Analysis and Design- Phase and Frequency Response FET Amplifier- Biasing Analysis and Design- Large Signal amplifiers- Harmonic Distortion, Analysis of Class A, Class B, Class AB, Class C and Class D Amplifiers.

Module 4: (12 Hrs)

Feedback Amplifiers :-- Types of Feedback(Positive, Negative, Voltage, Current, Shunt and Series Feedback) - Feedback in Amplifiers

Oscillators- Condition for Oscillation- Analysis and Design of RC Phase Shift Oscillators, Working of Hartley, Colpitt's and Wein Bridge Oscillators.

Module 5: (12 Hrs)

Wave Shaping Circuits:- Clipping, Clamping,RC Integrator, Differentiator, Transistor as a Switch- Astable, Monostable and Bistable Multivibrtaors, Sweep Generators.

Photo Devices:- LCD, Photodiode, Phototransistor, Optocoupler

Reference Books

1. Electronic Devices and Circuits:- Boylsted- Pearson Education
2. Electronic Principles:- Malvino- Tata McGraw Hill
3. Integrated Electronics:- Jacob Millman & Halkias Tata McGrawHill
4. Electronic Devices and Circuits: -Bogart – Universal Book Stall -Delhi
5. Electronic Devices- Floyd- Pearson Education
6. Microelectronics Digital and Analog Botkar Khanna Publishers

CS010 307(P): Programming Lab

Teaching scheme **Credits:** 2
3 hours practical per week

Objectives

- *To acquaint the students with the fundamentals of programming.*
- *To provide the students with good knowledge in C programming and develop problem solving skills.*

1. Familiarisation with computer system compliers, editors and operating systems etc.

2. Familiarisation with office packages

3. Programming experiments in C to cover input output statements, control statements, functions, string, arrays, Structures, pointers and files.

4. Programes to find factorial, Fibonacci series, palindrome, matrix operations, sort a set of names, search etc.

Any experiment according to the syllabus of CS010 303 can be substituted.

CS010 308 LOGIC DESIGN LAB

Teaching scheme **Credits:** 2

3 hours Practical per week

Objectives:-

To provide an introduction to Logic Systems Design thereby giving a hands on experience on working with digital ICS ,which enable the study Computer System Architecture.

1. Familiarization of Logic Gates and Realization of Logic Circuits using basic Gates.
2. Design and implementation of Arithmetic Circuits:- Half Adder, Full Adder, n bit Ripple Carry Adder, Carry Look ahead Adder, BCD Adder
3. Study of Flip Flops:- implementation of RS, JK, D, T and MS Flip Flops
4. Design and implementation of Synchronous and Asynchronous Counters, UP/DOWN Counters
5. Design and Implementation of Shift Registers, Counters using Shift Registers – Ring Counter and Johnson Counter
6. Study of Multiplexers , Demultiplexers, Encoder and Decoder
7. Design of Comparators and Parity Generators.