MT 201

MATHMATICS-III
(Common to all branches)

<table>
<thead>
<tr>
<th>Instruction</th>
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<tr>
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<tr>
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<td>75 marks</td>
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UNIT-I


UNIT-II

Fourier Series: Expansion of a function in Fourier series for a given range-odd and even functions of Fourier series-change of interval-Applications of Fourier series-square wave forms-saw tooth wave form and modified square saw tooth wave form-half range sine and cosine expansions-complex Fourier series.

UNIT-III

Applications of Partial differential equations: Solution of wave equation, heat equation and Laplace's equation by the method of separation of variables and their use in problems of vibrating string, one dimensional unsteady heat flow and two dimensional steady state heat flow.

UNIT-IV

UNIT-V

Suggested Reading:
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CS 202

**DISCRETE STRUCTURES**

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**UNIT-I**

**Fundamentals of Logic:** Basic Connectives and Truth Tables, Logical Equivalence, Logical Implication, Use of Quantifiers, Definitions and the Proof of Theorems.

**Set Theory:** Set and Subsets, Set Operations, and the Laws of Set theory, Counting and Venn Diagrams.

**Properties of the Integers:** The well – ordering principle, Recursive definitions, the division algorithms, fundamental theorem of arithmetic.

**UNIT-II**

**Relations and Functions:** Cartesian Product, Functions onto Functions, Special Functions, Pigeonhole Principle, Composition and Inverse Functions, Computational Complexity.

**Relations:** Partial Orders, Equivalence Relations and Partitions.

**Principle of Inclusion and Exclusion:** Principles of Inclusion and Exclusion, Generalization of Principle, Derangements, Rock Polynomials, Arrangements with Forbidden Positions.

**UNIT-III**

**Generating Functions:** Introductory examples, definition and example Partitions of Integers, exponential generating function, summation operator.

**Recurrence Relations:** First – order linear recurrence relation, second – order linear homogenous recurrence relation with constant coefficients, Non homogenous recurrence relation, divide and conquer algorithms.

**UNIT-IV**

**Algebraic Structures:** Algebraic System – General Properties, semi groups, Monoids, homomorphism, Groups, Residue arithmetic, group codes and their applications.
UNIT-V

Graph Theory: Definitions and examples, subgraphs, complements and graph Isomorphism, Vertex degree, Planar graphs, Hamiltonian paths and Cycles, Graph Coloring.


Suggested Reading:

CS 203

LOGIC AND SWITCHING THEORY

Instruction: 4 Periods per week
Duration of University Examination: 3 Hours
University Examination: 75 Marks
Sessional: 25 Marks

UNIT-I

Number Systems: Binary Numbers, Octal and Hexadecimal Numbers, Number Ranges.
Arithmetic Operations: Conversion from Decimal to other bases.
Decimal Codes: BCD Addition, Alphanumeric Codes: ASCII Character Code, Parity Bit.
Standard Forms: Minterms and Maxterms, Sum of Product and Products of Sums.

UNIT-II

Minimization of Switching Functions: Introduction, the map method, Minimal Functions and Their Properties, the tabulation procedure, the prime implicant chart.

UNIT-III

Combination Logic Design: Combinational Circuits, Design Topics: Design Hierarchy, Top-Down design, Computer Aided Design, Hardware Description Languages, Logic Synthesis. Analysis Procedure: Derivation of Boolean Functions, Derivation of the Truth Table, Logic Simulation, Design Procedure, Decoders, Encoders, Multiplexers, Binary Adders, Binary subtraction, Binary Multipliers, HDL Representations-VHDL.
UNIT-IV
Sequential Circuits: Sequential Circuit definitions. Latches, Flip Flops, sequential circuit analysis, sequential circuit design, design with D Flip Flops, designing with JK Flip- Flops, HDL representation for sequential circuits-VHDL.

UNIT-V
Registers and Counters: Registers, Shift registers, Synchronous Binary counters, Ripple Counter.

Suggested Reading:

CS 204

**COMPUTER ARCHITECTURE**

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UNIT-I

UNIT-II
Program Control: Status Bit Conditions, Conditional Branch Instructions, Subroutine Call and Return, Program Interrupt, Types of Interrupts, Reduced Instruction Set Computer: CISC.
Characteristics, RISC Characteristics, Overlapped Register Windows.

**UNI-III**

**Pipeline and Vector Processing:** Parallel Processing, Pipelining, Instruction Pipeline, RISC Pipeline, Vector Processing: Vector Operations, Matrix Multiplication, Memory Interleaving, Super Computers. Array Processors: Attached Array Processor, SIMD Array Processor.


**UNIT-IV**


**UNIT-V**

**Memory Organization:** Memory Hierarchy, Main Memory: RAM and ROM Chips, Address Map, Memory Connection to CPU, Auxiliary Memory: Disks and Tapes. Associative Memory: Hardware Organization, Match Logic, Read, Operation and Write Operation. Cache.

**Memory:** Associative Mapping, Direct Mapping, Set-Associative Mapping, Writing into Cache Initialization. Virtual Memory: Address and Memory Space, Address Mapping, Page Replacement.

**Suggested Reading:**

EC 222

BASIC ELECTRONICS
(For Mech., Prod., and CSE)
(Same as EC 222)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

UNIT-I


Rectifiers: Half wave and Full wave Rectifiers (Bridge, center tapped) with and without filters, ripple regulation and efficiency.

UNIT-II

Transistors: Bipolar and Field effect transistors with their h-parameters equivalent circuits. Basic amplifiers classification and their circuits (Qualitative treatment only).

Regulators and Inverters: Zener Diode regulator, Transistorized an IC regulators and Simple Inverter Circuits.

UNIT-III


Oscillators – LC Type and RC Type Oscillators and Crystal Oscillators (Qualitative treatment only)

UNIT-IV

Operational Amplifiers – Basic Principle – Characteristics and Applications (Summer Adder, Integrator, Differentiator, Instrumentation Amplifier).

Digital Systems: Basic Logic Gates, half, Full Adder and Subtractors.

UNIT-V

Data Acquisition systems: Study of transducer (LVDT, Straingauge, Temperature, Force). Photo Electric Devices and Industrial Devices: Photo diode, Photo Transistor, LED, LCD, SCR, TRAIC, DIAC, UJT Construction and Characteristics only.


Suggested Reading:
4. Cooper, Electronic Measurements and Instrumentations, 3/e., 1998. (Ch 7 )
CS 231
DATA STRUCTURES LAB USING C++

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks

List of Experiments:
1. Implementation of Stacks, Queues.
2. Infix to Postfix Conversion, evaluation of postfix expression.
3. Polynomial arithmetic using linked list.
4. Implementation of Binary Search and Hashing.
5. Implementation of Selection, Shell, Merge and Quick sorts.
6. Implementation of Tree Traversals on Binary Trees.
7. Implementation of Heap Sort.
8. Implementation of operations on AVL Trees.
10. Implementation of Splay Trees.

Note: For each of the problems PSP (Personal Software Process) Principles should be applied.

EC 242
BASIC ELECTRONICS LAB
(For Mech., Prod. & CSE)

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks

1. Characteristics of Semiconductor and Zener diodes
2. CRO Applications
3. Fullwave rectifier with and without filter
4. Zener Voltage Regulator
5. Characteristics of BJT transistor (CB.CE.CC)
6. Characteristics of field effect transistor.
7. Feedback amplifier and amplifier without feedback
8. h-parameters of transistors
9. Phase shift oscillator
11. Operational Amplifier and it’s applications
12. Logic gates and flip flops verifications
13. Realization of Half and Full adder
14. Comparators

Suggested Reading:

General Note:
1. There should not be more than 2 students per batch while performing any of the lab experiment.
2. Mini Project cum design exercise:
   a) The students must design, rig-up, and test the circuits wherever possible and should carry out the experiments individually.
   b) This exercise carries sessional marks of 10 out of 25, while the remaining 15 marks are for the remaining lab exercises.