AMEI-06 ANALOG & DIGITAL ELECTRONICS

UNIT-1 NUMBER SYSTEMS AND CODES & SWITCHING THEORY& COMBINATIONAL LOGIC CIRCUITS

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

1.2 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.

1.3 Combinational Logic Circuits:- Review of basic gates- Universal gates, Adder, Subtractor, Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder,

1.4 Carry Save Adder, Comparators, Parity Generators,

1.5 Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

UNIT-2 INTEGRATED CIRCUITS & SEQUENTIAL LOGIC CIRCUITS & COUNTERS AND SHIFT REGISTERS

2.1 Integrated circuits: - TTL and CMOS logic families and their characteristics.

2.2 Brief introduction to RAM and ROM.

2.3 Sequential Logic Circuits: Latches and Flip Flops- SR, D, T and MS-JK Flip Flops,

2.4 Asynchronous Inputs.

2.5 Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters , Shift Registers,

2.6 Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

UNIT-3 SYNCHRONOUS SEQUENTIAL CIRCUITS & FINITE STATE MACHINE

3.1 Synchronous Sequential Circuits: State Tables State Equations and State Diagrams,

3.2 State Reduction and State Assignment,

3.3 Design of Clocked Sequential Circuits using State Equations.

3.4 Finite state machine-capabilities and limitations, Mealy and Moore models minimization of completely specified and incompletely specified sequential machines,

3.5 Partition techniques and merger chart methods-concept of minimal cover table.

UNIT-4 ALGORITHMIC STATE MACHINE & FAULT DETECTION AND LOCATION

4.1 Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.

4.2 Fault Detection and Location: Fault models for combinational and sequential circuits,

4.3 Fault detection in combinational circuits;

4.4 Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

Reference Books:

1. A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
2. Taub ,Helbert and Schilling, "Digital Integrated Electronics", TMH