

## **EC/EI 804B ASIC DESIGN**

### **Module I**

Introduction to ASICs: - Types of ASICs - Design flow - CMOS logic: CMOS transistors CMOS Design rules - Combinational Logic Cell -Sequential logic cell - Data path logic cell I/O cells - ASIC library design: Transistors as Resistors - Transistor Parasitic Capacitance-Logical effort.

### **Module II**

Programmable ASICs: - Anti fuse - static RAM - EPROM and EEPROM technology practical issues - Programmable ASIC logic cells : Actel ACT - Xilinx LCA - Altera FLEX - Altera MAX. Programmable ASIC I/O cells : DC & AC inputs and outputs - Clock & Power inputs - Xilinx I/O blocks.

### **Module III**

Programmable ASIC interconnect: Actel ACT -Xilinx LCA - Xilinx EPLD - Altera MAX 5000 and 7000 - Altera MAX 9000 - Altera FLEX. Programmable ASIC design software : Design systems - Logic Synthesis - Half gate ASIC. Low level design entry : Schematic entry - Low level design language - PLA tools - EDIF- CFI design representation.

### **Module IV**

Logic synthesis: Verilog and logic synthesis -VHDL and logic synthesis. Simulation: types of simulation. : Testing: boundary scan test fault simulation - automatic test pattern generation.

### **Module VI**

ASIC construction: System partition - FPGA partitioning - partitioning methods - Floor planning and placement: floor planning - placement - physical design flow. Routing : global routing - detailed routing - special routing - circuit extraction – DRC.

### **Text book:**

1.) Michael John Sebastian Smith, "Application - Specific Integrated Circuits", Pearson Education, 1997.

### **References:**

1.) Andrew Brown, "VLSI Circuits and Systems in Silicon", McGraw Hill, 1991.

2.) S.D. Brown, R.J. Francis, J. Rox, Z.G. Uranesic, "Field Programmable Gate Arrays" - Kluwer Academic Publishers, 1992.

3.) Mohammed Ismail and Terri Fiez, "Analog VLSI Signal and Information Processing", McGraw Hill, 1994.

4.) S. Y. Kung, H. J. Whilo House, T. Kailath, " VLSI and Modern Signal Processing ", Prentice Hall, 1985.

5.) Jose E. France, Yannis Tsividis, "Design of Analog - Digital VLSI Circuits for Telecommunication and Signal Processing", Prentice Hall, 1994.