

**K L University**  
**Department of Electronics & Computer Engineering**  
**M.Tech (Embedded Systems)**

**Course No.** : 15-EM51A1  
**Course Title** : CPLD and FPGA Architecture and Applications  
**Course Structure** : 3-0-0

**SYLLABUS:**

**UNIT - I:**

**Introduction to Programmable Logic Devices:**

Introduction, Simple Programmable Logic Devices – Read Only Memories, Programmable Logic Arrays, Programmable Array Logic, Programmable Logic Devices/Generic Array Logic; Complex Programmable Logic Devices – Architecture of Xilinx Cool Runner XCR3064XL CPLD Implementation of a Parallel Adder with Accumulation.

**UNIT – II:**

**Field Programmable Gate Arrays:**

Organization of FPGAs, FPGA Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, and Programmable I/O blocks in FPGAs, Dedicated specialized Components of FPGAs, and Applications of FPGAs.

**UNIT – III**

**SRAM Programmable FPGAs:**

Introduction, Programming Technology, Device Architecture, The Xilinx XC2000, XC3000 And XC4000 Architectures.

**UNIT – IV**

**Anti-Fuse Programmed FPGAs:**

Introduction, Programming Technology, Device Architecture, The Actel ACT1, ACT2 and ACT3 Architectures.

**UNIT – V**

**Design Applications:**

General Design Issues, Counter Examples, A Fast Video Controller, A position Tracker for a Robot Manipulator, A Fast DMA Controller, Designing Counters with ACT devices, Designing Adders and Accumulators with the ACT Architecture.

**TEXTBOOKS:**

1. Field Programmable Gate Array Technology by Stephen M. Trimberger, Springer International Edition.
2. Digital Systems Design by Charles H. Roth Jr, Lizy Kurian John, Cengage Learning.

**REFERENCE BOOKS:**

1. Field Programmable Gate Arrays by John V. Oldfield, Richard C. Dorf, Wiley India.
2. Digital Design Using Field Programmable Gate Arrays by Pak K. Chan/Samiha Mourad, Pearson Low Price Edition.
3. Digital Systems Design with FPGAs and CPLDs by Ian Grout, Elsevier, Newnes.
4. FPGA based System Design by Wayne Wolf, Prentice Hall Modern Semiconductor Design Series.