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CP5010 RECONFIGURABLE COMPUTING

DETAILED SYLLABUS

UNIT I DEVICE ARCHITECTURE

General Purpose Computing Vs Reconfigurable Computing – Simple Programmable Logic Devices – Complex Programmable Logic Devices – FPGAs – Device Architecture - Case Studies.

UNIT II RECONFIGURABLE COMPUTING ARCHITECTURES AND SYSTEMS

Reconfigurable Processing Fabric Architectures – RPF Integration into Traditional Computing Systems – Reconfigurable Computing Systems – Case Studies – Reconfiguration Management.

UNIT III PROGRAMMING RECONFIGURABLE SYSTEMS

Compute Models - Programming FPGA Applications in HDL – Compiling C for Spatial Computing – Operating System Support for Reconfigurable Computing.

UNIT IV MAPPING DESIGNS TO RECONFIGURABLE PLATFORMS

The Design Flow - Technology Mapping – FPGA Placement and Routing – Configuration Bitstream Generation – Case Studies with Appropriate Tools.

UNIT V APPLICATION DEVELOPMENT WITH FPGAS

Case Studies of FPGA Applications – System on a Programmable Chip (SoPC) Designs.

REFERENCES:

1. Christophe Bobda, —Introduction to Reconfigurable Computing – Architectures, Algorithms and Applications, Springer, 2010.
2. Maya B. Gokhale and Paul S. Graham, —Reconfigurable Computing: Accelerating Computation with Field-Programmable Gate Arrays, Springer, 2005.
3. FPGA Frontiers: New Applications in Reconfigurable Computing, 2017, Nicole Hemsoth, Timothy Prickett Morgan, Next Platform.
4. Reconfigurable Computing: From FPGAs to Hardware/Software Codesign 2011 Edition by Joao Cardoso (Editor), Michael Hübne, Springer

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5. Scott Hauck and Andre Dehon (Eds.), —Reconfigurable Computing – The Theory and Practice of FPGA-Based Computation, Elsevier / Morgan Kaufmann, 2008.

OBJECTIVES:

To understand the need for reconfigurable computing

To expose the students to various device architectures

To examine the various reconfigurable computing systems

To understand the different types of compute models for programming reconfigurable architectures

To expose the students to HDL programming and familiarize with the development environment

To expose the students to the various placement and routing protocols

To develop applications with FPGAs