

Syllabus of Proposed Open Elective for BE (E & TC)

404190: Programmable System on Chip (PSoC)

Teaching Scheme:

Lectures: 4 hrs/ Week

Examination Scheme

Paper: 100 Marks (3 hrs Duration)

Unit I

Introduction to PSoC

PSoC Technology, Programmable Routing and Interconnect, Configurable Analog and Digital Blocks, CPU Sub system, Families of PSoC (PSoC 1,PSoC 3,PSoC 5), Difference between PSoC and conventional MCU.

(6 hrs)

Unit II

Introduction to PSoC 3/5

PSoC 3/5 architecture - block diagram, system wide resources, I/O interfaces, CPU subsystem, memory organization, digital subsystems, analog subsystems

(8 hrs)

Unit III

PSoC Design Modules

Why Cypress PSoC, Structure of PSoC, PSoC designer Suit, limitations of PSoC, improvements of the PSoC, PSoC subsystem design, PSoC memory management.

(8 hrs)

Unit IV

Mixed-Signal Embedded design

Overview of mixed-signal embedded system designs, hardware and software subsystems of mixed-signal architectures, PSoC Hardware components, PSoC Software components, PSoC interrupt subsystem, Introduction to PSoC Express, system design using PSoC express. (8 hrs)

Unit V

PSoC Components

Universal Digital Blocks (UDB), UDB arrays and Digital System Interconnect (DSI), Timer, Counter and PWM, Digital Filter Blocks (DFB), $\Delta\Sigma$ ADC topologies and circuits, programmable gain amplifiers, Switched capacitor / continuous time, analog routing, flash temperature sensors, DTMF dialers, Sleep timers, UART, I2 C, SPI, USB, CAN buses. **(8 hrs)**

Unit VI

System design using PSoC

Interfacing of temperature Sensors and Tachometers, SPI and UART based task communications, Lower Noise Continuous Time Signal Processing with PSoC, Data Acquisition and Control System with PSoC, Ultra wide-band RADAR, Serial Bit Receiver with Hardware Manchester Decoder, DTMF Detector, Ultrasonic Vehicle Parking Assistant, Universal Wide-Range Signal Generator. **(10 hrs)**

Text Books:

1. PSoC 3, PSoC 5 Architecture Technical Reference Manual – Cypress website
2. My First Five PSoC 3 designs (e-book) by Robert Ashby – Cypress website

Reference Books

1. Designers Guide to the Cypress PSoC by Robert Ashby – Elsevier Publications
2. Introduction to Mixed Signal Embedded Design, Alex Doboli-Springer
3. The Beginners Guide to Using PSoC Express: Mixed-Signal Microcontroller Development Without code by Oliver H. Bailey- Timelines Industries Incorporated, 2007
4. PsoC Mikrocontroller by Fredi Krüger Franzis, 2006

Web references

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