

# Basic Course Content

## **RF Circuit Design (Code: COEB01)**

**Introduction:** Introduction to RF & RFIC Design, significance of RF & microwave component, Introduction about Passive And Active IC Component & High Frequency Behaviour Of Lumped Components, Introduction to Microstrip Line, Impedance Matching(Pi & T match), Impedance matching using Smith Chart.

**ADS/AWR Introduction:** Tool Introduction, creation of an RF network, Basic Simulation, Tuning Of component, Layout(EM& CO).

**Lumped Component Simulation & Layout:** Filter (LPF, BPF, stub filter using Microstrip), Coupler, Attenuator, Power Divider, Oscillator, Patch Antenna, Amplifier Simulation Using S2P File, component selection, issues & challenges in PCB Design & Fabrication.

## **Embedded System Design (Code: COEB03)**

**Introduction:** Aurdino UNO having ATMEGA 328 microcontroller, ARM 7- TDMI, Raspberry Pi with ARM 11 processor, Basic of ViSim Embedded System.

Interfacing of various peripherals, sensors, Debugging and basic programming of boards mentioned above.

## **Digital image processing (Code: COEB04)**

Matlab Commands, variable Declaration Types of noise in images, spatial transforms, Denoising, Thresholding, Segmentation, Neighbourhood Processing, Point Processing, Implementation of above methods in Matlab. Concatenations of matrix: matrix addition/subtraction/multiplication/\*

Linear combination of matrices: image fusion/ image filtering, histogram Equalization, projects.

## **Lab View-GSD Basic Programming (Code: COEB05)**

**Introduction :** 1. Lab View (Graphical System Design), 2. Basic programming, 3. Tools for programming

# Advanced Course Content

## **RF IC Design (Code: COEA01)**

**Introduction:** Introduction to RF & RFIC Design Flow, RF Transceiver, Gain, P1dB, stability, Noise Figure, Impedance Matching, Introduction to different process (GaAs, SiGe, BiCMOS, CMOS), Amplifier Topologies (Single Stage, Cascode) & Biasing Techniques,  
**Fabrication:** Introduction To Foundry & PDK, Introduction to IC Fabrication Process, Procedure of Fabrication of RF IC's

**Tool Introduction:** Circuit Design, Basic Simulation, Tuning Of component, Layout Introduction  
**Simulation With Examples:** Basic Amplifier, DC Simulation, S Parameter Simulation & Smith Chart, HB Simulation, Power Amplifier (PA), Low Noise Amplifier (LNA), Layout Design of Amplifier (PA or LNA), Question & Answer

## **Embedded System Design (Code: COEA03)**

1. Raspberry pi with fundamentals image processing.
2. Introduction and programming of MyRio

## **Digital image Processing (Code: COEA04)**

### **Lab View – GSD Advanced Programming (Code: COEA06)**

- 1) Fast forward introduction to Lab VIEW (Graphical System Design)
- 2) Advance programming
- 3) Structured programming
- 4) Application Development
- 5) Error Handling and Debugging

# Certificate Course Content

## **Antenna Design & Simulation (Code: COEC01)**

Introduction to Antenna, Different Antenna parameters theory, introduction to simulation software (Cad-Feko), designing of various antennas in Cad –Feko, Fabrication of prototypes, VNA testing of antenna.

## **Wireless Communication (Code: COEC02)**

VOIP (Voice over IP) , SDR, Cognitive Radio: Spectrum Sensing, Analysing Base band Signal, Energy Detection using Cognitive Radio. RF wireless Communication: Signal Generation analysis using various programmable reconfigurable hardware platforms (Wi-Comm-T, NI). And testing using Advanced Testbed (Arbitrary Waveform Generator-Real Time Signal Analyzer), Study and analysis of 2X2 MIMO, Networking protocol Analysis using various simulators and HW platforms.

## **Wireless Sensor Network And Ban (Code: COEC03)**

**Introduction :** This course will cover hardware aspects of various sensor motes such as (environmental sensor, industrial monitoring sensors etc.). Focus will be on programming, study of XCTU tool. Third party sensor interfacing. Hands on training on advanced technology WSN kit, National Instruments WSN kit and Crossbow kit.

## **Communication Network & Applications (Code: COEC04)**

## **LabVIEW-CGSD based HardWare Interfacing (Code: COEC05)**

1. Fast forward introduction to LabVIEW (Graphical System Design)
2. Hardware interfacing
3. Basic Interfacing using MyRio NI hardware
4. FPGA programming
5. Wireless Configuration of MyRio
6. Image Processing using MyRio