

# Electronics & ICT Academy

(Under Ministry of Electronics and Information Technology (MeitY), Govt. of India)

Indian Institute of Technology Guwahati, Guwahati, Assam, Pin 781039

Phone: +91-361-2582503, 2582536 Email: eictacad@iitg.ernet.in

**Venue:** Indian Institute of Technology Guwahati.

**Date:** 17-22 December, 2017.

**Reporting time on 17<sup>th</sup> December is 09:00 am.**

Date	Time	Topic
17-12-2017 (Day 1)	09.00am-09.30am	Registration & Reporting
	09.30am-10.00am	Inauguration
	10.00am-10.15am	Tea Break
	10.15am-12.15pm (2 Hours)	<b>Impedance Matching</b> <ul style="list-style-type: none"> <li>▪ Smith Chart Basic</li> <li>▪ Lumped Element Matching</li> <li>▪ Stub Matching</li> </ul>
	12.15pm-01.15pm (1 Hour)	<b>Coupler/ Divider</b> <ul style="list-style-type: none"> <li>▪ Wilkinson Power Divider</li> </ul>
	01.15pm-02.00pm	Lunch Break
	02.00pm-03.30pm (1 Hour and 30 minutes)	<b>Coupler/ Divider (Continued)</b> <ul style="list-style-type: none"> <li>▪ Branch Line Coupler</li> <li>▪ Coupled Line Coupler</li> </ul>
	03.30pm-03.45pm	Tea Break
	03.45pm-05.15pm (1 Hour and 30 minutes)	<b>Coupler/ Divider (Continued)</b> <ul style="list-style-type: none"> <li>▪ Rat Race Coupler</li> <li>▪ Waveguide Couplers</li> </ul>
	05:15pm-05.30pm	MCQ 1
18-12-2017 (Day 2)	09.00am-11.00am (2 Hours)	<b>Microwave Filters</b> <ul style="list-style-type: none"> <li>▪ Insertion loss Method of filter design</li> <li>▪ Stepped impedance implementation</li> </ul>
	11.00am-11.15am	Tea Break
	11.15am-01.15am (2 Hours)	<b>Microwave Filters (Continued)</b> <ul style="list-style-type: none"> <li>▪ Coupled Line Filters</li> <li>▪ Filters using coupled resonators</li> </ul>
	01.15pm-02.00pm	Lunch Break
	02.00pm-04.00pm (2 Hours)	<b>Microwave Amplifier Design</b> <ul style="list-style-type: none"> <li>▪ High Gain Amplifier Design</li> </ul>
	04.00pm-04.15pm	Tea Break
	04.15pm-05.15pm (2 Hours)	<b>Microwave Amplifier Design (Continued)</b> <ul style="list-style-type: none"> <li>▪ LNA Design</li> </ul>
	05.15pm-05.30pm	▪ MCQ 2
19-12-2017 (Day 3)	09.00am-11.00am (2 Hours)	<b>Microwave Amplifier Design (Continued)</b> <ul style="list-style-type: none"> <li>▪ Oscillator Design</li> <li>▪ Power Amplifier</li> </ul>
	11.00am-11.15am	Tea Break
	11.15am-12.15pm (1 Hour)	<b>Basic of RF PCB design and some thumb rules.</b>
	12.15pm-01.00pm	Lunch Break

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	01.00pm-03.00pm (2 Hours)	Hands-on
	03.00pm-03.15pm	Tea Break
	03.15pm-05.15pm (2 Hours)	Hands-on
	05.15pm-05.30pm	MCQ
20-12-2017 (Day 4)	09.00am-10.00am (1 Hour)	<b>RF Circuit Design and Simulation using ADS</b> <ul style="list-style-type: none"> <li>Advance Design System (ADS) Overview for MMIC, RFIC &amp; RF Circuit Design and Simulation.</li> </ul>
	10.00am-10.15am	Tea Break
	10.15am-12.15pm (2 Hours)	<b>ADS Schematic simulations (Example: Amplifier)</b> <ul style="list-style-type: none"> <li>DC Simulation</li> <li>AC Simulation</li> <li>Linear Simulation</li> <li>Non-Linear Simulation</li> </ul>
	12.15pm-01.15pm (1 Hour)	<b>Electromagnetic Simulation and Layout</b> <ul style="list-style-type: none"> <li>Patch Antenna</li> <li>Defective Ground Plane Simulation</li> <li>Antenna and Circuit Co-Simulation</li> </ul>
	01.15pm-02.00pm	Lunch Break
	02.00pm-03.30pm (1 Hour 30 minutes)	<b>System Level Simulation for 5G using SystemVue</b> <ul style="list-style-type: none"> <li>Overview on System Level design and simulation using SystemVue.</li> <li>5G Physical Layer Design and Simulation.</li> </ul>
	03.30pm-03.45pm	Tea Break
	03.45pm-05.00pm (1 Hour 15 minutes)	<ul style="list-style-type: none"> <li>Phased Array Beamforming techniques for 5G.</li> <li>5G Test Bench using instrument integration.</li> </ul>
	05.00pm-05.15pm	MCQ
21-12-2017 (Day 5)	09.00am-11.00am (2 Hours)	<b>RF/Microwave Component Characterization</b> <ul style="list-style-type: none"> <li><b>Network Analyzer</b> <ol style="list-style-type: none"> <li>Network Analysis</li> <li>Conceptual Block Diagram</li> <li>Reflection Measurement Errors</li> <li>Transmission Measurement Errors</li> <li>Calibration: 12 Term Error Model</li> <li>Calibration procedures: TOSL, TRL, LRM, LRL, TRL*, LRM*</li> <li>Calibration Standards and Coefficients</li> <li>Measurement Limitations and Sources of Error</li> <li>Instrument Specifications</li> </ol> </li> </ul>
	11.00am-11.15am	Tea Break
	11.15am-01.15pm (2 Hours)	<ul style="list-style-type: none"> <li><b>Component and System Measurement Examples</b> <ol style="list-style-type: none"> <li>S-Parameters</li> <li>Gain/Loss</li> <li>Compression</li> </ol> </li> </ul>

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		<ul style="list-style-type: none"> <li>4. Reflection Coefficient, VSWR, Return Loss etc.</li> <li>5. Inter-modulation Distortion</li> <li>6. Lab Exercise</li> </ul>
	01.15pm-02.00pm	Lunch Break
	02.00pm-03.15pm (1 Hour 15 minutes)	<b>RF/Microwave Signal Analysis</b> <ul style="list-style-type: none"> <li>▪ <b>Spectrum Analyzer</b> <ul style="list-style-type: none"> <li>1. Spectral Analysis</li> <li>2. Conceptual System Block Diagram</li> <li>3. Measurement Limitations and Sources of Error</li> </ul> </li> </ul>
	03.15pm-03.30pm	Tea Break
	03.30pm-05.00pm (1 Hour 30 minutes)	<b>Antenna Test</b> <ul style="list-style-type: none"> <li>▪ Overview of antenna characterization</li> <li>▪ Antenna Measurement System Design Considerations</li> <li>▪ System Configuration and Performance Comparison</li> </ul>
	05.00pm-05.15pm	MCQ
22-12-2017 (Day 6)	09.00am-11.00am (2 Hours)	<ul style="list-style-type: none"> <li>▪ <b>Mixed Domain instruments -For Time domain, Frequency Domain &amp; Digital /Logic measurement.</b> Instrument/product Detail-- High-Definition Oscilloscope: 8GHz, 4 Analog Plus 16 Digital Channels.</li> </ul>
	11.00am-11.15am	Tea Break
	11.15am-01.00pm (1 Hour 45 minutes)	<ul style="list-style-type: none"> <li>▪ <b>Modular Instrument-AWG &amp; Digitizer Combo Instruments:</b> Instrument/Product details-PXI Based AWG and Digitizer Combination.</li> </ul>
	01.00pm-02.00pm	Lunch Break
	02.00pm-03.30pm (1 Hour 30 minutes)	<ul style="list-style-type: none"> <li>▪ <b>Advanced Communication Measurement &amp; Analysis Tools –</b> Vector Signal Analyzer + Vector Signal Generator</li> </ul>
	03.30pm-03.45pm	Tea Break
	03.45pm-05.00pm (1 Hour 15 minutes)	<ul style="list-style-type: none"> <li>▪ <b>Measurement &amp; Characterization with IV, CV &amp; Electrometer:</b> SMU/Parametric Analyzer + Impedance Analyzer+ Electrometer</li> </ul>
	05.00pm-05.15pm	MCQ
	05.15pm-05.30pm	Certificate distribution and Closing ceremony