



RAMP PLUS TECHNOLOGIES Pvt.Ltd.

Title of the Course: **RF Circuits design, Analysis and Testing**

Total Duration: **240 Hours**

Preamble:

- The training program focuses on the RF part for about 8 weeks.
- There will be 40 days of classes in this period at the rate of 6 hours per day.
- Totally, there will be 120 hours of theory and 120 hours of lab activity.
- We also propose to make use of the services of a reputed training center in telecom during this schedule.
- We will have experts from industry and research institutions contributing to the program
- A full fledged RF lab set up in a well known institution is also proposed to be involved in the design of the final curriculum

Theory Modules- RF Circuits design, Analysis and Testing			
Sl. No	Module Code	Title	Duration
		Introduction to RF circuits.	
1.		✚ Introduction to RF and Electromagnetics,	08 Hours
2.		✚ Introduction to Random processes and Noise	06 hours
3.		✚ High frequency devices. limitations of Conventional devices at High Frequencies. RF CMOS devices MEMS,	08 Hours
4.		✚ Transmission lines and waveguides, Theory and applications	08 Hours
5.		✚ Introduction to Microwave technology: Conventional and MMIC.	06 Hours
		Microwave measurements	03 Hours
6.		✚ Modeling of RF devices and circuits Basic concepts in RF design	04 Hours
7.		✚ S parameter analysis	04 Hours
8.		✚ Modulation and detection; Analog and Digital techniques	04 Hours

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9.		✚ Multiple access techniques	04 Hours
10		✚ Introduction to Digital Communication techniques	04 Hours
11		✚ Multiple access techniques and wireless standards	04 Hours
12		The analysis of the most known RF circuits:	
13		✚ RF Amplifiers, Construction, design, analysis, devices, vacuum tube and solid state, Low noise amplifiers, Frequency synthesizers. RF Power amplifiers	08 Hours
14		✚ Oscillators, Phase noise, Bipolar and CMOS Oscillators	05 Hours
15		✚ Attenuators, Types, theory, design, Equalisers, Types	04 Hours
16		✚ Detectors, High frequency devices. , PLL and applications,	04 Hours
17		✚ Concept of IF, theory, circuits, Up and down converters, Mixers, Circuits, analysis and design, Frequency dividers	06 Hours
18		✚ Filters: Analog, digital, Passive and active, High frequency filters,	06 Hours
19		✚ Power Dividers, Power measurements,	03 Hours
20		✚ RF Switches, Switching at RF, Devices. EMI/EMC	03 Hours
21		✚ Isolation, blocking and matching circuits, Impedance matching,	03 Hours

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22		<ul style="list-style-type: none"> ✚ Design of high power transmitters and components. Transceiver architectures, 	03 Hours
23		<ul style="list-style-type: none"> ✚ Case study: design of broadband receiver with high dynamic range 	06 Hours
24		<ul style="list-style-type: none"> ✚ UHF and VHF, Microwave systems, Mobile communication systems ✚ Testing methods for RF circuits. Motorola. Philips, Lucent transceivers 	06 Hours
Total Number of Theory Hours			120 Hours

Laboratory Modules			
Sl. No	Module Code	Title	Duration
1		<ul style="list-style-type: none"> ✚ Simulation Tools for electronic circuits and RF Components and Systems <p>Laboratory activities will include the following: MOST OF THE CONCEPTS DISCUSSED IN THE THEORY SESIONS WILL BE VERIFIED BY WAY OF ANALYSIS, SIMULATION, CASE STUDY, FIELD VISIT, DESIGN, IMPLEMENTATION, Measurements, EXPERIMENTATION ETC., depending on the suitability</p>	40 Sessions of 3 hours each
2		<ul style="list-style-type: none"> ✚ Simulation tools using some freeware for EMW theory, S parameters, Transmission lines, Noise and Random signals etc., 	
3		<ul style="list-style-type: none"> ✚ MATLAB toolbox for Communication 	
4		<ul style="list-style-type: none"> ✚ Tools from Agilent technologies like Genesis and EMD 	

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		Simulation.	
5		✚ Educational versions of Software from ANSOFT, RF CMOS Simulation tools, RF Circuit Layout, Packaging	
6		✚ Numerical Methods and techniques. Device modeling	
		Total Number of Lab Hours	120 Hours

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