

## 5-Day Hands on Workshop – RF System design / simulation using ADS and SystemVue

Date:	3-Dec-2015 to 5-Dec- 2015 & 8-Dec-2015 to 9-Dec- 2015
Day	Thursday to Saturday and Tuesday to Wednesday
Time Duration:	9:00am to 5:00pm
Location:	Bangalore
Venue:	To be announced

### Course Description

This 5-Day workshop addresses the following key areas: Practical hands on how to **RF system design and simulation using ADS**, Introduction to Modern wireless communication systems, Linear circuit design covering LNA and Filter, Non-linear circuit design covering RF Power Amplifier using LDMOS and GaN Transistors in CW / Pulse mode operation and High efficiency / Broadband Doherty PA.

RF system design to cover Analog and digital modulation schemes, Architectures, Multiple Access methods, TDD and FDD schemes, System-level specifications, transmitter and receiver parameters, analog and digital functional blocks, RF system architecture examples. Critical block-level specifications and impairments (e.g. noise, P1dB, IIP3, IIP2, gain, bandwidth, phase noise and spurs), system level performance metrics (e.g. BER, EVM, modulation type, sensitivity and selectivity)

**Laptop with ADS / SystemVue software installed** will be required for each participant for hands on session. Temporary licenses will be issued in advance to each participant.

### Who should attend?

Practicing Engineers / Scientists interested in pursuing RF, Microwave, and Wireless product design  
Students pursuing Graduation, Masters / PhD in RF & Microwave, Communication systems

### By taking this course, you will better understand

- Fundamental Concepts of RF system / circuit design
- Understand Practical challenges and learn how to design / deliver RF systems
- Design and simulation using EDA tools ADS and SystemVue

### Learning Objectives

- Best practices in using ADS or SystemVue for RF system design and simulation – Advanced Techniques
- Linear circuit design and simulation – LNA and Filter design using ADS with example
- Non-linear circuit design and simulation – High Power Amplifier using ADS with example
- LNA & Filter – layout design, simulation, EM analysis through co-simulation
- PA – with LDMOS / GaN technology, Non-Linear device Models, Pulsed / CW mode operation and Doherty circuit

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#### FINETUNING ACADEMY

 A-407, Shriram Srishti, SSA Road, Anand Nagar, Bangalore – 560 032, India

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## Workshop Sessions & Schedule

Day-1 Topics, Dec-3, Thursday	Time
<b>Introduction to Modern Wireless Communication Systems</b> (Overview of wireless communications - frequency hopped spread spectrum digital systems - receivers, transmitters, digital modulation and demodulation techniques - data link communication techniques - trade-offs in system - size, cost, performance - Multipath, antenna diversity - Commercial & defence networks)	900-1030
Tea Break	1030-1100
<b>RF Circuit design Fundamentals</b> (Impedance Matching Networks, Using Smith Chart, Transmission Lines, S-Parameters, Passive Circuits-Power Dividers, Couplers, and Filters. Active Circuits-Small Signal amplifiers, Low-noise and High Gain Amplifiers, Stability Circles, PCB Layout considerations)	1100-1230
Lunch Break	1230-1330
Introduction to ADS and SystemVue - Design & Simulation Tools	1330-1500
Tea Break	1500-1530
Antenna - Fundamental Concepts	1530-1700

Day-2 Topics, Dec-4, Friday	Time
Linear Circuit design - Small Signal Active devices	900-1030
Tea Break	1030-1100
LNA design and simulation (ADS Example)	1100-1230
Lunch Break	1230-1330
Linear Circuit design - Passive Components	1330-1500
Tea Break	1500-1530
Filter design and simulation (ADS Example)	1530-1700

Day-3 Topics, Dec-5, Saturday	Time
<b>Non-Linear Circuit design - Power Amplifier</b> ( Linear PA Design, Different classes of operation, non-linear effects in PA, efficiency enhancement Techniques, Linearization Techniques, comparison of device technologies )	900-1030
Tea Break	1030-1100
PA design (Simulation examples)	1100-1230
Lunch Break	1230-1330
Layout design concepts	1330-1500
Tea Break	1500-1530
EM Simulation concepts	1530-1700

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Day-4 Topics, Dec-8, Tuesday	Time
<b>RF System design</b> (Spur analysis, cascaded analysis of Up Converter/Down converter, effect of Phase noise and non-linearity on microwave system performance, measurement techniques. Simulation covering Up Converter/Down converter analysis.)	900-1030
Tea Break	1030-1100
<b>RF System design</b> (Analog and digital modulation schemes, Architectures, Multiple Access methods, TDD and FDD schemes, System-level specifications , transmitter and receiver parameters, analog and digital functional blocks )	1100-1230
Lunch Break	1230-1330
<b>RF System design</b> (Critical block-level specifications and impairments (e.g. noise, P1dB, IIP3, IIP2, gain, bandwidth, phase noise and spurs), system level performance metrics (e.g. BER, EVM, modulation type, sensitivity and selectivity))	1330-1500
Tea Break	1500-1530
<b>RF System design</b> (RF system architecture examples)	1530-1700

Day-5 Topics, Dec-9, Wednesday	Time
<b>RF System design</b> (Simulation Example)	900-1030
Tea Break	1030-1100
<b>RF System design</b> (Simulation Example)	1100-1230
Lunch Break	1230-1330
<b>RF System design</b> (Simulation Example)	1330-1500
Tea Break	1500-1530
Wrap Up	1530-1700

## Speakers

**Bhupinder Singh** received his Master's Degree in Microwave System Design from IIT Kanpur, Kanpur India. He has 23 years of RF system / subsystem design, development and testing for Govt, Military, and Cellular and VSAT industry. He is currently Director-Technical at RF Specialities. He was a scientist at Aeronautical Development Establishment from 1991-2001. Previously he was RF Design Lead at HFCL, DMC-STRATEX, Blackbay, Technical Head-Telecom R&D at Astra MWP, Eminent Systems. He is an advanced user of Simulation tools like ADS, MWO, ALTIUM and ACAD. He is skilled at using Spectrum Analyzer, NW Analyzer, Vector Signal Analyzers, signal generators. **RF Specialities** (RFS) is one of the leading companies in the development, design, servicing and maintenance of RF Equipment in India. Boasting of a state-of-the-art RF laboratory and backed with experienced & well-trained manpower, it provides unique and cost-effective solutions in the shortest turn-around time for the satellite, broadcasting, telecom and military industry.

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## Fee payable

Flexible Duration	Course Fee
1-Day	₹ 6,950
2-Days	₹ 13,750
3-Days	₹ 20,500
4-Days	₹ 25,000
5-Days	₹ 28,500

Course Fee includes 14% Service Tax

Please note,

- The group discount is available, 5% for 5+ participants and 10% for minimum of 10 participants
- Student discount is 15%

### Electronic Funds Transfer

A/c Name Finetuning Academy

A/c Number 020405500429

Account Type Current

Bank Name ICICI BANK LTD

Branch R T NAGAR

IFSC Code ICIC0000204

Bank Address 5, P & T Colony, R T Nagar Main Road, BANGALORE, KARNATAKA-560032

Note: Please send us the funds transfer details to [support@finetuningrf.com](mailto:support@finetuningrf.com)

Or

Cheque / DD payable at Bangalore in favour of "**Finetuning Academy**" to

Kind attention: Nandakumar.S, A-407, Shriram Srishti, SSA Road, Anand Nagar, and Bangalore-560 032. Karnataka. Phone 080-42197333 / Mobile 70222 77805

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## How to Register?

Please fill out registration form and email the form to [support@finetuningrf.com](mailto:support@finetuningrf.com)

## Registration Form

**“5-Day Hands on Workshop – RF System design / simulation using ADS and SystemVue**  
3-Dec-2015 to 5-Dec- 2015 & 8-Dec-2015 to 9-Dec- 2015 at Bangalore

1. Name of the Participant:  
(In BLOCK Letters only)
2. Company Name:
3. Contact Phone number:
4. Email id:

### Optional information

5. Years of work Experience:
6. Briefly describe your work experience:
7. Areas of interest:
8. Topics of interest:
9. Simulation Tools familiar with:

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