How to apply
Attendees should submit the registration form which can be found on the website www.esoa-web.org/courses by accessing the "Reconfigurable Antennas and Arrays" course page.

Prerequisites
• Antenna basic theory
• Familiarity with RF Systems, Microwave Circuits and RFIC

Course general info
Schedule: 25hrs of teaching - 6hrs of laboratory - 4hrs of personal exercises
Availability: 20 students
Credits: 2 ECTS for attendance and exercises

Registration fee
• Non-profit institution: €450*
• Profit institution: €1150*
• Grants will be offered to 4 students
* €10 discount for IEEE, IET and EuMA members

For further information please contact:
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Fax 0049 731 5032409
Email: saps@uni-ulm.de
www.esoa-web.org/courses

Venue

Reconfigurable Antennas and Arrays
Doctoral Course
Ulm University, Germany
August 31 – September 4 2015
Course description

The aim of this course is to provide students with an introduction to the design fundamentals of reconfigurable antennas and arrays.

The course covers application oriented topics by motivating design drivers with specific case studies and showing some examples of current research developments. Background information will be also provided on basic array theory, semiconductor technology and integration aspects.

The course includes two hands-on sessions on reconfigurable antennas and on phased arrays. A case study on automotive radars will allow attendees to have an industrial perspective of reconfigurable arrays. The course will be concluded by a lab visit and by a live demo.

Course program

**Introduction**  
- Applications and design drivers

**Reconfigurable antenna design and applications for low and high frequencies**  
- State of the art and challenges -Examples of research on mm-wave reconfiguration technologies

**Introduction to components and analysis for reconfigurable antennas**  
- Introduction to Components and Analysis for Reconfigurable Antennas
- Introduction to components
- Performance parameters for components
- Microwave circuit and antenna analysis
- System level behavioural models
- Balanced to unbalanced converter technology
- Active antennas

**Phased array concepts and architectures**  
- Basic phased array theory (active impedance, scan blindness, etc)
- Phased array architectures (e.g. phase shifter, DBFN, MIMO)

**MMIC introduction and design flow**  
- Types of Reconfiguration Devices and Technology
- MMIC in antenna applications: system aspects and technology context
- Introduction to MMIC, design process and strategies for re-configurability
- DC bias and other considerations

**Introduction to semiconductor technologies and devices**  
- Semiconductor technologies
- Reconfigurable Si-Ge MMIC design
- MMIC building blocks, including active and passive blocks needed for on-chip re-configurability

**MMIC front ends**  
- MMIC functional blocks
- Integrated front ends
- Design examples
- Packaging and integration

**System integration**  
- Antenna types and feeds for highly integrated packages
- Integration of devices into antennas, including surface mount, MMIC, LTCC
- Interconnects and assembling issues
- Packaging and thermal management

**Special Lectures**

**CASE STUDY**  
- Automotive radar systems

**DESIGN EXAMPLE**  
- Ka-band SatCom on-the-move user terminal

**LAB VISIT**

**LIVE DEMO**

Will your next smartphone have a reconfigurable antenna?

**Course organizers**

Prof. H. Schumacher, Ulm University - Germany  
Prof. P. Gardner, University of Birmingham - UK  
Dr. L. Boccia, University of Calabria - Italy