EUROPEAN SCHOOL OF ANTENNAS

SCHOOL OF ADVANCED PROFESSIONAL STUDIES

Reconfigurable Antennas and Arrays

AIM

The aim of this course is to provide students with an introduction to the fundamentals of the design of reconfigurable antennas and arrays and to show them some examples of current research and development.

COURSE SPECIFICATION

Date	August 31 – September 4 2015
Location	Ulm, Germany
Organizers	Hermann Schumacher (SAPS-Ulm), P. Gardner (Uni. Birmingham), L. Boccia (Unical)
Credits	1.5 ECTS credits

COURSE DESCRIPTION

Day 1 (August 31, 2015)

INTRODUCTION	2 HOURS
Welcome and course structure Drivers to the need for reconfigurable antennas and arrays Applications Where the antenna reconfigurability is the application bottleneck: 5G, SatCom on the move, WiGig Types of Reconfigurable antennas and arrays Frequency reconfiguration Pattern and polarisation reconfiguration	

RECONFIGURABLE ANTENNA DESIGN AND APPLICATIONS FOR LOW AND HIGH FREQUENCIES	PROF. ALEX FERESIDIS 5 HOURS
State of the art and challenges Examples of research on mm-wave reconfiguration technologies - advantages and disadvantages.	

Day 2 (September 1, 2015)

Introduction to Components and Analysis for Reconfigurable Antennas	Prof. Peter Gardner 4 hours
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	

CST Design Session	Prof. Peter Gardner 3 hours
Reconfigurable antenna examples: design and simulations using CST Microwave Studio	

Day 3 (September 2, 2015)

Phased arrays Concepts and architectures	Prof. G. Amendola 4 hours
Basic phased array theory (active impedance, scan blindness, etc) Phased array architectures (e.g. phase shifter, DBFN, MIMO)	

MMIC introduction and design flow	Prof. H. Schumacher 3 hours
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	

Day 4 (September 3, 2015)

Introduction to Semiconductor technologies and devices	Prof. H. Schumacher 3 hours
Semiconductor technologies Reconfigurable Si-Ge MMIC design MMIC building blocks, including active and passive blocks needed for on-chip re-configurability	

MMIC front ends	L. Boccia 2 hours
MMIC functional blocks Integrated front ends Design examples Packaging and integration	

System integration	Prof. W. Menzel 2 hours
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	

Day 5 (September 4, 2015)

CASE STUDY: AUTOMOTIVE RADARS: : ANTENNAS AND SYSTEM CONCEPTS	PROF. CHRISTIAN WALDSCHMIDT 3 HOURS
Automotive radars System Concepts Automotive radar antennas	

DESIGN EXAMPLE #1:	TOBIAS CHALOUN 1 HOUR
Design of a reconfigurable active reflectarray in Ka band (EU FLEXWIN project)	

KEYSIGHT ADS HANDS ON LAB SESSION	FILIPE TARABANI 2.5 HOURS
Design of a 30 GHz low-noise amplifier in Si/SiGe BiCMOS	

LAB VISIT AND LIVE DEMO	TOBIAS CHALOUN 0.5 HOURS
Demonstration of the Ka-band active reflectarray module (EU FLEXWIN project) in the lab	