

Hoch- und Höchstfrequenzhalbleiterschaltungen (HHHS) Millimeter-Wave Monolithic Integrated Circuit Design

Winter Term 2016/2017

Organization

INSTITUT FÜR HOCHFREQUENZTECHNIK UND ELEKTRONIK



Organizational Issues

■ Lectures HHHS (23419)

- Prof. Dr. rer. nat. Dr. h.c. Manfred Thumm
- manfred.thumm@kit.edu
- Monday 8:00 – 09:30 HIS (30.35)



■ Exercises HHHS (23421)

- Dipl.-Ing. Daniel Müller
- daniel.mueller@kit.edu
- Friday 8:00 – 9:30 Eiermann HS (see ILIAS)
- Exercise: Advanced Design System (ADS)
von der Fa. Keysight (see ILIAS)



■ Lecture + Exercise Information

- ILIAS (Integriertes Lern-, Informations- und Arbeitskooperations-System)
- Link on IHE page
- http://www.ihe.kit.edu/VorlesungenWS_846.php

Lecture History

■ HHHS “then and now”

Prof. Thumm

HHHS

up to Winter Term 09/10

Powerpoint Viewgraphs:
Sebastian Diebold

Prof. Kallfass
(now University
of Stuttgart)
HHHS
in Winter Term
+
AICMMA
in summer term

Winter Term 14/15
**Prof. Zwick and
Ulrich Lewark**
HHHS essentials
+
AICMMA essentials
=
HHHS
(from WT 13/14)

Winter Term 16/17
Prof. Thumm
HHHS
Winter Term 14/15
+
RFE
Thumm, Wiesbeck
HECTOR School 11

“Active Integrated Circuits for Millimeter
Wave Applications (AICMMA)”

“Radio Frequency Electronics”

Lecture Outline

- Millimeter-Wave Monolithic Integrated Circuits (MMIC)
 - Analog frontends for radar and communication systems
 - MIC vs. MMIC: definitions, applications, pro/con
 - MMIC building blocks: passive: transmission lines, ... active: transistors, ...
 - MMIC stability/instability: Rollett/Nyquist Criteria

- MMIC Design (linear)
 - Low noise amplifiers, applications, noise- and power-matching, ...
 - Broadband amplifiers
 - Power amplifiers

- MMIC Design (non-linear)
 - Oscillators (MIC)
 - Frequency multipliers
 - Mixers
 - Switches

Lecture Pre-Requisites

- High Frequency Techniques (GHF)
 - Smith-Chart, Transmission Line Transformation, ...

- Semiconductor Basics (HLB)
 - Schottky Diode, Varactor, Field Effect Transistor (FET), Bipolar Transistor, ...

HHHS Schedule

Week	Date	Mo. 8.00 – 9.30 HSI	Date	Fr. 14:00 – 16:30 (IHE Room 3.27)
43	24/10/2016	HHHS lecture	28/10/2016	-
44	Fr. 28/10/2016	HHHS lecture NTI 1.31	04/11/2016	-
45	07/11/2016	HHHS lecture	11/11/2016	-
46	14/11/2016	HHHS lecture	18/11/2016	HHHS Exercise* / ADS Introduction**
47	21/11/2016	HHHS lecture	25/11/2016	HHHS ADS Exercise
48	28/11/2016	HHHS lecture	02/12/2016	HHHS ADS Exercise
49	05/12/2016	HHHS lecture	09/12/2016	HHHS ADS Exercise
50	12/12/2016	HHHS lecture	16/12/2016	-
51	19/12/2016	HHHS lecture	23/12/2016	-
52	26/12/2016	Christmas	30/12/2016	-
1	02/01/2017	Monday after New Year	06/01/2017	-
2	09/01/2017	HHHS lecture	13/01/2017	-
3	16/01/2017	HHHS lecture	20/01/2017	HHHS ADS Exercise
4	23/01/2017	HHHS lecture	27/01/2017	-
5	30/01/2017	HHHS lecture	03/02/2017	HHHS ADS Exercise
6	06/02/2017	HHHS lecture	10/02/2017	-
7	13/02/2017	HHHS lecture	17/02/2017	HHHS ADS Exercise (optional)

* 08:00 – 9:30 Eiermann Hörsaal / ** 14:00 – 15:30 IHE Room 1.31

Exam

■ Oral

- Language: English or German
- Duration: ~ 25 min

■ Contents

- PDF slides of the lectures

■ Exam-Dates

- Approx. 6th March 2017
- Approx. 13th March 2017
- Approx. 20th March 2017