

# Course Program High-Speed Devices FFF115 2013

Lectures: 30 h

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Excercises: 10h

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Litterature Study Presentaion: 2h

**Formal requirements:** ESS030 Physics of Devices OR FFF021 Semiconductor Physics OR ETIN70 Modern Electronics.

**Examination:** 3 × hand ins, Oral presentation on device performance, written exam (textbook and handouts allowed)

**Course book:** *Fundamentals of III-V Devices: HBTs, MESFETs, and HFETs/HEMTs*, by W. Liu (Wiley Interscience, ISBN 978-0471297000). Notes on Ballistic MOSFETs.

**Home Page:** <http://www.eit.lth.se/course/fff115>

There will be PDF-versions of the PPT-slides used during the lectures available for download. It is instructive to print these and bring them to the lectures.

## Course Schedule:

### Week 3

Tue 19/1 10.15-12.00	E:2311	F1 Introduction / Semiconductor Physics I
Thur 21/1 10.15-12.00	E:2517	F2 Semiconductor Physics II
Fri 22/1 8.15-10.00	E:2311	F3 Transistor Fundamentals

### Week 4

Tue 26/1 10.15-12.00	E:2311	F4 Heterostructure PN junctions
Thur 28/1 10.15-12.00	E:2517	F5 HBT DC
Fri 29/1 8.15-10.00	E:4116	E1 Basic Properties

### Week 5

Tue 2/2 10.15-12.00	E:2311	F6 FET Electrostatics
Thur 4/2 10.15-12.00	E:2517	F7 Diffusive FET DC
Fri 5/2 8.15-10.00	E:4116	E2 Transistors

Hand in 1: HBT band structure.

### Week 6

Tue 9/2 8.15-10.00	E:2311	F8 Ballistic FET DC
Thur 11/2 10.15-12.00	E:2517	F9 Small Signal parameters & Gains
Fri 12/2 8.15-10.00	E:4116	E3 Transistors DC

Week 7

Tue 16/2 10.15-12.00	E:2311	F10 Intrinsic HBT AC
Thur 18/2 10.15-12.00	E:2517	-
Fri 19/2 15.15-17.00	E:4116	E4 Transistors AC+DC

Hand in 2: HEMT band structure simulation.

Week 8

Tue 23/2 10.15-12.00	E:2311	F12 Intrinsic FET AC
Thur 25/2 10.15-12.00	E:2517	F13 Resistances and parasitics
Fri 26/2 08.15-10.00	E:4116	E5 Transistors AC

Week 9

Tue 1/3 10.15-12.00	E:2311	F14 Microwave Gains
Thur 3/3 10.15-12.00	E:2517	F15 Noise
Fri 4/3 8.15-10.00	E:2311	Project presentations

Hand in 3: Parameter Extraction.

Exam:

**14.00-19.00 E:2517. Handouts, Notes and the course book are allowed on the exam!**