

32002 - DOPAF - High Frequency and Optoelectronic Devices

Coordinating unit: 230 - ETSETB - Escola Tècnica Superior d'Enginyeria de Telecomunicació de Barcelona
Teaching unit: 710 - EEL - Department of Electronic Engineering
Academic year: 2009
Degree: MASTER IN ELECTRONICS ENGINEERING (Syllabus 2006). (Teaching unit Optative)
ELECTRONICS ENGINEERING, PLA 92 (Syllabus 1992). (Teaching unit Optative)
TELECOMMUNICATION ENGINEERING (Syllabus 1992). (Teaching unit Optative)
Credits: 6 Teaching languages: Catalanian, Spanish, English

Lecturers

Coordinator: JUAN MIGUEL LOPEZ GONZALEZ

Others: JUAN MIGUEL LOPEZ GONZALEZ

Teaching methodology

Learning method has three stages:

1. Knowledge presentation and summary guide
2. Activities and student work
3. Student results presentation and discussion

Learning objectives of the subject

Electronic semiconductor devices for radio frequency and microwaves.

(ENG) 0. Presentació del curs

1. MATLAB High Frequency Device modelling

2. Extraction of parameters and modelling of devices using IC-CAP

1. Transmission lines and microwaves

2. RLC Circuits

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Content

3. Lineal two-ports

4. Power gain

5. Materials and components for hybrid circuits of High Frequency, HF, -RF and Microwaves-.

6. Materials and components for MMIC circuits

7. Models for passive structures

8. Models for HF diodes

9. Compact models for HF effect field devices of HF

10. Compact models for HF bipolar devices of HF.

11. Matching and stability of the HF amplifiers.

12. Noise.

13. Noise in HF transistors and amplifiers.

14. Distortion and linearity.

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Content planning

Week: 1	Content: 1. MATLAB High Frequency Device modelling
	Content: 2. Extraction of parameters and modelling of devices using IC-CAP
	Content: (ENG) 0. Presentació del curs
Week: 2	Content: 1. Transmission lines and microwaves
Week: 3	Content: 2. RLC Circuits
Week: 4	Content: 3. Lineal two-ports
Week: 5	Content: 4. Power gain
Week: 6	Content: 5. Materials and components for hybrid circuits of High Frequency, HF, -RF and Microwaves-.
	Content: 6. Materials and components for MMIC circuits
Week: 7	Content: 7. Models for passive structures
Week: 8	Content: 8. Models for HF diodes
Week: 9	Content: 9. Compact models for HF effect field devices of HF

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Week: 10	Content: 10. Compact models for HF bipolar devices of HF.
Week: 11	Content: 11. Matching and stability of the HF amplifiers.
Week: 12	Content: 12. Noise.
Week: 13	Content: 13. Noise in HF transistors and amplifiers.
Week: 14	Content: 14. Distortion and linearity.

Qualification system

activities results: 60 %

presentation and discussion of results: 40 %

Regulations for carrying out activities

Prior skills

Basic Electronics, Theory of circuits, basic MATLAB

Requirements

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Bibliography

Basic:

Rohde, U.L.; Newkirk, D.P. RF/microwave circuit design for wireless applications. New York [etc.]: John Wiley and Sons, 2000. ISBN 0471298182.

González, G. Microwave transistor amplifiers: analysis and design. 2nd ed. Englewood Cliffs, NJ: Prentice Hall, 1997. ISBN 0132543354.

López-González, J.M. El transistor bipolar de heterounión: física, electrónica y microondas. Barcelona: Edicions UPC, 2002. ISBN 8483015668.

Sischka, F. IC-CAP characterization handbook. 2002.

Complementary:

Gilmore, R.; Besser, L. Practical RF circuit design for modern wireless systems. Boston, MA: Artech House, 2003. ISBN 1580535216.

Gilmore, R.; Besser, L. Practical RF circuit design for modern wireless systems (Vol. 2: Active circuits and systems). Boston, MA: Artech House, 2003. ISBN 1580535224 (V.2).

Lee, T.H. Planar microwave engineering: a practical guide to theory, measurement and circuits. Cambridge University Press, 2004. ISBN 0521835267.

Maas, S.A. Nonlinear microwave and RF circuits. 2nd ed. Boston; London: Artech House, 2003. ISBN 1580534848.

Others resources: