

# COURSE GUIDE



Dean Prof. Daniela Tărniceriu

## 1. Program info

1.1 Higher education institution	"Gheorghe Asachi" Technical University of Iasi
1.2 Faculty / Department	Electronics, Telecommunications and Information Technology
1.3 Department	Telecommunications and Information Technologies
1.4 Field	Electronic Engineering, Telecommunications and Information Technology
1.5 Study level	Bachelor's Degree Studies
1.6 Study program / Qualification	Telecommunications Systems and Technologies

## 2. Course info

2.1 Course name: Microwave Devices and Circuits for Radiocommunications						Code: EDOS412T	
2.2 Course organizer (lecturer)		Associate Professor Radu Florin Damian					
2.3 Teaching assistants		Associate Professor Radu Florin Damian					
2.4 Year of study	4	2.5 Semester	7	2.6 Assessment	E	2.7 Type of subject	DS

## 3. Estimated total time (hours per semester for teaching activities)

3.1 Number of hours per week	3	3.2 lecture	2	3.3 seminar/laboratory	1
3.4 Total number of hours in curricula	42	3.5 lecture	28	3.6 seminar/laboratory	14
Time distribution					hours
Textbook, course support, references and course notes study					22
Library, electronic platforms and on site documentation					23
Seminar/laboratory preparation, homework, reports, portfolios and essays					8
Tutoring					7
Assessment					2
Other activities					0
3.7 Total individual study hours	62				
3.9 Total hours per semester	104				
3.10 Number of credit points	4				

## 4. Prerequisites (where applicable)

4.1 curricula type	<ul style="list-style-type: none"> <li>• Microwaves</li> <li>• Signals, Circuits and Systems</li> <li>• Special Mathematics</li> <li>• Mathematical Analysis</li> <li>• Physics</li> </ul>
4.2 competence type	<ul style="list-style-type: none"> <li>• Propagation of electromagnetic waves</li> <li>• Complex numbers/functions Mathematics</li> <li>• The Smith chart</li> <li>• Calculation of Distributed Circuits</li> </ul>



## 5. Infrastructure (where applicable)

5.1. for lectures	lecture theater with computer and projector
5.2. for laboratories	computer network with CAD software Ansys HFSS and/or Keysight Advanced Design System and/or AWR Microwave office

## 6. Specific competences

Transversal competences	Professional competences	CP1	C1 Use of fundamental elements relating to devices, circuits, systems, instrumentation and electronic technology (D1, D2, D3, D4, D5)	Credits (from 4) 0.75
		CP5	C5 Selection, installation, configuration and operation of fixed or mobile telecommunication equipment and installment at a specific location of common telecommunication networks (D1, D2, D3, D4, D5)	0.25
		CP6	C6 Solving specific problems for broadband communications networks: propagation in different transmission media, high frequency circuits and equipment (microwave and optical) (D1, D2, D3, D4, D5)	2.0
	Transversal competences			Credits (from 4)
		CT3	CT3 Adaptation to new technologies, professional and personal development, through continuous training using sources of printed documentation, specialized software and electronic resources in Romanian and at least in an international language	1.00

## 7. Course targets (as resulting from 6. Specific competences table)

7.1 Course main target	<ul style="list-style-type: none"> <li>In-depth knowledge of the theoretical, methodological and practical developments specific to microwave design techniques (impedance matching, microwave filters, amplifier design).</li> </ul>
7.2 Course specific targets	<p>The students must gain:</p> <ul style="list-style-type: none"> <li>Knowledge of frequently used microwave devices and circuits;</li> <li>Capacity to design applications that use these devices;</li> <li>The necessary knowledge to understand the future microwave devices and circuits that will appear during their active professional life.</li> </ul>

## 8. Contents

8.1 Lectures	Teaching methods	Notes
1. Impedance matching and tuning	lecture	4 hours
2. Directional couplers	lecture	4 hours
3. Power dividers	lecture	2 hours
4. Microwave filters	lecture	6 hours
5. Microwave amplifier design	lecture	6 hours
6. Oscillators and mixers	lecture	6 hours
References:		
1. Microwave and Optoelectronics Laboratory, <a href="http://rf-opto.etti.tuiasi.ro">http://rf-opto.etti.tuiasi.ro</a>		
2. David Pozar, Microwave Engineering, Wiley; 4th edition, 2011		
8.2 Laboratory	Teaching methods	Notes
1. Introduction and recapitulation	exercises	1 session
2. Impedance matching and tuning in ADS	computer simulation	1 session
3. Directional couplers in ADS	computer simulation	1 session
4. Design and simulation of an transistor amplifier in ADS	computer simulation	2 sessions
5. Design and simulation of an microwave amplifier in ADS (personal homework)	computer simulation	2 sessions



## References:

1. Microwave and Optoelectronics Laboratory, <http://rf-opto.etti.tuiasi.ro>
2. David Pozar, Microwave Engineering, Wiley; 4th edition, 2011

**9. Course contents corroboration with the expectations of the epistemic community representatives, professional associations and relevant employers in the field of the program**

- In determining the content of the discipline and the methods of teaching / examination, the course organizer consulted with both Romanian and foreign academic community. He also took into account the opinions and expectations of the main industry representatives in Romania, with whom we have constant collaborations.
- The curriculum content of prestigious universities in the country and abroad was studied and largely adopted into present course, including one the most used textbooks (Pozar).
- The objectives of the discipline are in perfect harmony with the faculty curriculum, transmitting knowledge and forming necessary skills for future specialists in the field of electronics, telecommunication and information technology.

**10. Assessment**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Percentage of final grade
10.4 Lectures	Theoretical knowledge acquired Capacity to apply this knowledge in small design problems	Written exam; All materials/devices are allowed; 2 hours;	50% (passing grade: 5)
10.5 Laboratory	Team Homework for Lab sessions 1-4	Correctness of results for the team homework	25% (passing grade: 5)
	Personal Homework (Lab session 5) Design and simulation of an microwave amplifier	Assessment of fulfillment of personal design goals	25% (passing grade: 5)

**10.6 Minimum performance standard**

- Attendance at minimum 7 sessions (course + laboratory)
- Passing grade minimum 5; Taking into account the multitude of subjects involved, the passing grade is obtained (statistically estimated according to the results of previous years) according to the following rules:
  - Participation in all the evaluation activities of the discipline: final exam / laboratory / personal homework **and**
  - Essential knowledge, which may consist of
    - Knowledge of microwave devices and circuits, average level; **or**
    - The ability to design a microwave circuit, average level; **or**
    - Knowledge and correct use of microwave specific terminology, medium level; **or**
    - A combination of previous skills at a lower level (beginner);

Completion date: 16.09.2019 Course organizer signature,

Teaching assistant signature,

Department approval date,

Department director signature,

16. SEP. 2019