

# COURSE GUIDE 2019-2020



Dean, Prof. Daniela Tarniceru

## 1. Program info

1.1 Higher education institution	"Gheorghe Asachi" Technical University of Iași
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: Antennas and Propagation						Code: EDOS302.1	
2.2 Course organizer (lecturer)			Professor.Irinel Casian Botez				
2.3 Teaching assistants			Assistant Professor Damian Radu				
2.4 Year of study	3	2.5 Semester	2	2.6 Assessment	E	2.7 Type of subject	ED

## 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	18				
Library, electronic platforms and on site documentation	9				
Seminar/laboratory preparation, homework, reports, portfolios and essays	9				
Tutoring	8				
Assessment	6				
Other activities	14				
3.7 Total individual study hours	64				
3.9 Total hours per semester	106				
3.10 Number of credit points	4				

## 4. Prerequisites (where applicable)

4.1 curricula type	Field Theory.
4.2 competence type	

## 5. Infrastructure (where applicable)

5.1. for lectures	Video-projector, EM-Pro 2016 EDA Software
5.2. for laboratories	EM-Pro 2016





## 6. Specific competences

Professional competences	<ul style="list-style-type: none"> <li>- Electromagnetic radiated propagation</li> <li>- Evaluate specifications of MW antennas</li> <li>- Software tools usage</li> </ul>
Transversal competences	Efficiently use of the information sources, communication and training resources.

## 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 antenna (radiated propagation, specific antenna analysis, specific antenna parameters, antenna EDA software)</li> </ul>
7.2 Course specific targets	<ul style="list-style-type: none"> <li>• Demonstrate that it has acquired sufficient knowledge to understand the notions studied</li> <li>• Understand critically, explain and interpret the theoretical, methodological and practical developments specific to microwave antennas</li> <li>• Apply the basic methods and principles correctly in obtaining the optimal solution regarding the requirements of the specification sheet.</li> </ul>

## 8. Contents

8. 1 Lectures	Teaching methods	Notes
Introduction (Types of Antennas, Radiation Mechanism)	Combination of the lecture, explanation, and debate.	2 lectures
Fundamental Parameters Of Antennas (Radiation Pattern, Radiation Power Density, Radiation Intensity, Directivity, Gain, Antenna Efficiency, Half-Power Beamwidth, Beam Efficiency, Bandwidth, Polarization, Input impedance, Antenna Vector Effective Length and Equivalent Area, Friis Transmission Equation, Antenna Temperature)		2 lectures
Radiation Integrals and Auxiliary Potential Functions (The vector Potential A, The vector Potential F, Solution of the Inhomogeneous Vector Potential Wave Equation, Far-Field Radiation, Duality Theorem. Reciprocity and Reaction Theorems)		3 lectures
Linear Wire Antennas		2 lectures
Loop Antennas		2 lectures
Arrays: Linear, Planar and Circular		3 lectures
References: 1. Casian Botez Irinel, „Microunde, - vol.3”, Ed. Tehnopres , 2008, 190pag. 2. Balanis C.A., “Antenna Theory – Analysis and Design” , John Wiley & Sons,1997, 995 pag., ISBN: 0-471-59268-4. 3. Samuel Silver, "Microwave Antena Theory and Design", 1949, MIT Radiation Laboratory, McGraw Hill Book Company Inc.		
8. 2 Laboratory	Teaching methods	Notes
Wave Propagation	EM-Pro 2016	1 lab
Wire linear Antenna	EM-Pro 2016	1 lab
Dipol Antenna	EM-Pro 2016	1 lab
Loop Antennas	EM-Pro 2016	1 lab
Horn Antennas	EM-Pro 2016	1 lab
Patch Antennas	EM-Pro 2016	1 lab
Planar Patch Arrays	EM-Pro 2016	1 lab
References: EM-Pro 2016 Tutorial, Keysight Inc.		



**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 discipline holders consulted with both Romanian and foreign academic counterparts with whom they have links. It also takes into account the opinion and expectations of the main industrial actors in Romania, with whom we have constant collaborations. The objectives of the discipline are in perfect harmony with the curriculum, transmitting information and forming skills necessary for future specialists in the field of electronics, telecommunication and information technology. The program was designed to integrate the discipline into the curriculum for the specialization of Telecommunications Technologies and Systems, the curriculum content of prestigious universities in the country and abroad.

**10. Assessment**

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Percentage of final grade
10.4 Final Evaluation	- The level of assimilation of specialized language		
	- Correctness and completeness of Knowledge - Logical consistency and appropriate use of microwave concepts		60%
10.5 Half-yearly evaluation	• how to use EM-Pro software in antennas design;	Laboratory reports	40%

**10.6 Minimum performance standard**

1. Knowledge of: Gain, directivity, beam width, far-field zone, design of a patch antenna using EM-Pro 2016. .

Completion date: 09/09/2019

Course organizer signature,

Teaching assistant signature,

Prof.dr.ing. Casian Botez Irinel

S.L. dr. ing. Damian Radu

Department approval date,

Department director signature,

Conf.dr.ing.Scripcariu Luminita

**16. SEP. 2019**



