

# SYLLABUS<sub>1</sub>

## 1. Information about the program

1.1 Higher education institution	POLITEHNICA UNIVERSITY TIMISOARA
1.2 Faculty <sub>2</sub> / Departments <sub>3</sub>	FACULTY OF ELECTRONICS AND TELECOMMUNICATIONS / COMMUNICATIONS
1.3 Chair	—
1.4 Field of study (name/code <sub>4</sub> )	ELECTRONIC AND TELECOMMUNICATIONS ENGINEERING / 100
1.5 Study cycle	LICENSE
1.6 Study program (name/code)/Qualification	TECHNOLOGY AND TELECOMMUNICATIONS SYSTEMS / 20202010020 /Technologies and telecommunication systems

## 2. Information about the discipline

2.1 Name of discipline	DIGITAL RADIO COMMUNICATIONS						
2.2 Coordinator (holder) of course activities	ALEXA FLORIN						
2.3 Coordinator (holder) of applied activities <sub>5</sub>	VESA ANDY-RAZVAN						
2.4 Year of study <sub>6</sub>	IV	2.5 Semester	8	2.6 Type of evaluation	E	2.7 Type of discipline	DS

## 3. Total estimated time (hours / semester of didactic activities)

3.1 No. of hrs. / week	3 , of which:	3.2 course	1.5	3.3 seminar/laboratory/ project/training	1.5
3.4 Total no. of hrs. in the education curricula	42 , of which:	3.5 course	21	3.6 applied activities	21
3.7 Distribution of time for individual activities related to the discipline					hrs.
Study using a manual, course materials, bibliography and lecture notes					15
Additional documentation in the library, on specialized electronic platforms and on the field					4
Preparation for seminars / laboratories, homeworks, assignments, portfolios, and essays					7
Tutoring					4
Examinations					3
Other activities					3
<b>Total hrs. of individual activities</b>					<b>36</b>
3.8 Total hrs. / semester <sub>7</sub>	78				
3.9 No. of credits	3				

<sup>1</sup> The form corresponds to the Syllabus promoted by OMECTS 5703/18.12.2011 (Annex3).

<sup>2</sup> The name of the faculty which manages the educational curriculum to which the discipline belongs.

<sup>3</sup> The name of the department entrusted with the discipline, and to which the course coordinator / holder belongs.

<sup>4</sup> Fill in the code provided in GD no. 493/17.07.2013.

<sup>5</sup> The applied activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

<sup>6</sup> The year of study to which the discipline is provided in the curriculum.

<sup>7</sup> It is obtained by summing up the number of hrs. from 3.4 and 3.7.

#### 4. Prerequisites (where applicable)

4.1 Curriculum	<ul style="list-style-type: none"> <li>• Signal processing</li> <li>• Radio communications</li> <li>• Audio and Video Systems</li> </ul>
4.2 Competencies	<ul style="list-style-type: none"> <li>•</li> </ul>

#### 5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> <li>•</li> </ul>
5.2 to conduct practical activities	<ul style="list-style-type: none"> <li>•</li> </ul>

#### 6. Specific competencies acquired

Professional competencies <sup>§</sup>	<ul style="list-style-type: none"> <li>• Application of basic methods for acquisition and signal processing</li> <li>• design, implementation and operation of services of data, voice, video, multimedia, based on understanding and applying fundamental concepts in the field of communications</li> <li>• Selection, installation, configuration and exploitation of fixed and mobile telecommunications equipment and equipping a site with usual telecommunications networks</li> </ul>
Transversal competencies	<ul style="list-style-type: none"> <li>• Methodical analysis of the problems encountered in activity, identifying items for which there are dedicated solutions, thus ensuring professional tasks</li> <li>• Adaptation to the new technologies, professional and personal development through continuing education using printed documentation sources, specialized software and electronic resources</li> </ul>

#### 7. Objectives of the discipline (based on the grid of specific competencies acquired)

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>• Knowing radio and TV transmitters and solutions used for power transmitter. Understanding the principles of digital broadcasting, and presentation of the latest generation of digital broadcasting systems.</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>• The parameters and architectures for the main solution for analog and digital radio transmitters used in one way communication.</li> </ul>

#### 8. Content

8.1 Course	No. of hours	Teaching methods
Introduction in broadcasting systems principles of broadcasting and main structure for high power transmitter.	3 hours	exposure, direct interaction with the student, practical examples,

<sup>§</sup> The professional competencies and the transversal competencies will be treated according to the Methodology of OMECTS 5703/18.12.2011. The competencies listed in the National Register of Qualifications in Higher Education [Registrul Național al Calificărilor din Învățământul Superior RNCIS] ([http://www.rncis.ro/portal/page?\\_pageid=117,70218&\\_dad=portal&\\_schema=PORTAL](http://www.rncis.ro/portal/page?_pageid=117,70218&_dad=portal&_schema=PORTAL)) will be used for the field of study from 1.4 and the program of study from 1.6 of this form, involving the discipline.

		comparative analyzes
Analog broadcasting: AM and FM transmitters	2 hours	
Analog broadcasting: TV transmitters	2 hours	
FM stereo and RDS systems (principles, signal processing, architectures for transmitters and receivers)	3 hours	
Principles of multi carrier transmission	3 hours	
Digital Audio Broadcasting	4 hours	
Digital Video Broadcasting	4 hours	
Bibliography <sup>9</sup>		
1. Dietmar Kopitz, Bev Marks - RDS: The Radio Data System, Artech House, Boston • London, 1999 EBU		
2. W. Hoeg, T. Lauterbach – Digital Audio Broadcasting – Principles and Applications of Digital Radio, John Wiley 2003		
3. Rice, Michael - Digital communications : a discrete-time approach. Upper Saddle River, New Jersey: Pearson Education International: Prentice Hall, 2009		
4. Fl. Alexa – Digital Radiocommunications, slides - intranet.etc.upt.ro		
5. Kolimbris, Harold. Digital communications systems : With satellite and fiber optics applications. New Jersey [etc.]: Prentice Hall, [2000]		
6. Proakis, John G.. Digital communications. Boston, McGraw-Hill, [2001]		
7. ETSI TS 101 545-1 V1.2.1 (2014-04)		
8. ETSI EN 302 755 V1.3.1 (2012-04) - Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)		
<b>8.2 Applied activities<sup>10</sup></b>	<b>No. of hours</b>	<b>Teaching methods</b>
Digital transmission: ASK modulation	2 hours	exposure, simulation, case study, problem-solving, project methods, assessments every practical work

<sup>9</sup> At least one title must belong to the department staff teaching the discipline, and at least 3 titles must refer to national and international works relevant for the discipline, and which can be found in the Politehnica University Library.

<sup>10</sup> The types of applied activities are those specified in footnote 5. If the discipline contains several types of applied activities, then these will be written consecutively in the lines of the table below. The type of activity will be written in a distinct line, as „Seminar:“, „Laboratory:“, „Project:“ and/or „Practice/Training:“.

Digital transmission: FSK modulation	2 hours	
Digital transmission: QAM modulation	2 hours	
Stereo Coder and Decoder	3 hours	
DAB Coder and Decoder – MATLAB simulation	3 hours	
DVB Coder and Decoder – MATLAB simulation	3 hours	
Building and study of FM receiver	6 hours	

#### Bibliography <sup>11</sup>

1. Vesa Andy-Răzvan, Călin-Mihai Simu - Radiocomunicații, Experimente și aplicații – Editura Orizonturi Universitare, Timișoara, 2015
2. Proakis, John G.. Digital communications. Boston, McGraw-Hill, [2001
3. ETSI TS 101 545-1 V1.2.1 (2014-04)
4. ETSI EN 302 755 V1.3.1 (2012-04) - Digital Video Broadcasting (DVB); Frame structure channel coding and modulation for a second generation digital terrestrial television broadcasting system (DVB-T2)

#### 9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

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#### 10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Gaining knowledge related discipline, understanding technologies / methods presented	Written examination, 2 hours and 30 minutes	60%
10.5 Applied activities	<b>S:</b>		
	<b>L:</b> level of familiarity with the various topics presented	Continuous assessment, written and oral examination	40%
	<b>P:</b>		
	<b>Pr:</b>		
<b>10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified)</b>			
<ul style="list-style-type: none"> <li>• The minimum mark in order to pass the examination is 5, corresponding to basic understanding of the theoretical aspects of the course and the ability of solving simple numerical applications similar to the examples presented in the course</li> </ul>			

<sup>11</sup> At least one title must belong to the staff teaching the discipline.

**Date of completion**

15.03.2015

**Course coordinator**

**(signature)**

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**Coordinator of applied activities**

**(signature)**

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**Head of Department**

**(signature)**

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**Date of approval in the Faculty Council<sup>12</sup>**

**Dean**

**(signature)**

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<sup>12</sup> Avizarea este precedată de discutarea punctului de vedere al board-ului de care aparține programul de studiu cu privire la fișa disciplinei.