SYLLABUS[1]

1. Information about the program

1.1 Higher education institution	Politehnica University Timişoara
1.2 Faculty[2] / Department[3]	Electronics and Telecommunications Engineering / Measurements and Optical electronics
1.3 Chair	—
1.4 Field of study (name/code[4])	Electronics and Telecommunications (in English)/20-20-100-20
1.5 Study cycle	Bachelor
1.6 Study program (name/code)/Qualification	Telecommunications Technologies and Systems (in English)/ Engineer

2. Information about the discipline

2.1 Name of discipline			Electronic Instrumentation				
2.2 Coordinator (holder) of course activities			Mâțiu-Iovan Liliana				
2.3 Coordinator (holder) of applied activities [5]			Mâțiu-Iovan Liliana, Iftode Cora				
2.4 Year of study[6]	3	**2.5** Semester	1	**2.6** Type of evaluation	E	**2.7** Type of discipline	mandatory

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

3.1 No. of hrs. / week	4 , of which:	**3.2** course	2	**3.3** seminar/laboratory/ project/training	2
3.4 Total no. of hrs. in the education curricula	56 , of which:	**3.5** course	28	**3.6** applied activities	28
3.7 Distribution of time for individual activities related to the discipline					hrs.
Study using a manual, course materials, bibliography and lecture notes					10
Additional documentation in the library, on specialized electronic platforms and on the field					10
Preparation for seminars / laboratories, homeworks, assignments, portfolios, and essays					8
Tutoring					2
Examinations					3
Other activities - preparing a topic to be present to the class					2
Total hrs. of individual activities					35

3.8 Total hrs. / semester[7]	91
3.9 No. of credits	4

4. Prerequisites (where applicable)

---

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

2 The name of the faculty which manages the educational curriculum to which the discipline belongs.

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

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

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

6 The year of study to which the discipline is provided in the curriculum.

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

4.1 Curriculum	• Electrical and Electronic Measurements
4.2 Competencies	• basic knowledge of electronic circuits and measurements

5. **Conditions** (where applicable)

5.1 of the course	• Medium size hall. Support materials: laptop, projector, whiteboard
5.2 to conduct practical activities	• Specific laboratory for electronic measurements, equipped with measuring devices, oscilloscopes, signal generators, pulse generators, digital multimeters, spectrum analyzer, data acquisition systems, computers

6. **Specific competencies acquired**

Professional competencies[8]	• Fundamentals of electronic devices, circuits, systems, instrumentation and technology • Apply basic methods for signal acquisition and processing
Transversal competencies	• Adapting to new technologies, professional and personal development through continuing education using printed documentation sources, specialized software and electronic resources in English language and/or other language

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

7.1 General objective of the discipline	• Basic knowledge on electronic measuring instrumentation, aimed to provide the skills and abilities for appropriate use in conducting experimental work
7.2 Specific objectives	• Acquiring an overview of the types of measuring devices and specifically how to use it • Obtaining the skills for the correct use of the measuring equipment • Acquiring the correct style of approach and execution of experiments using specific devices and results interpretation

8. **Content**

8.1 Course	No. of hours	Teaching methods
1. Oscilloscopes. The general purpose analog oscilloscope. Description and use. Vertical and horizontal deflexion blocks. Time base. Synchronization. Probes. Digital oscilloscope. Sampling techniques	10	PPT lecture presentations, Interactive discussions, examples,

8 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) 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.

2. Signal generators. Pulse generators. Sine wave generators: low frequency, radio frequency. Function generators. Arbitrary wave geenerators.	6	videos ,problem solving
3. Digital voltmeters and multimeters. Measurement techniques and errors. DC digital voltmeters. Digital multimeters. Analog to digital converters. Current to voltage converter, AC-DC converters, Resistance to voltage converters.	6	-ll-
4. Universal counters. Universal counters – functions**.** Frequency and period mesurements. Microprocessor-based counters. Errors.	2	-ll-
5. Spectrum analyzers. Filter bank analyzers. FFT analyzers. Heterodyne analyzers.	2	-ll-
6. PC-based measuring instrumentation, virtual instrumentation. Basic concepts. Examples.	2	-ll-

Bibliography[9] 1. https://intranet.etc.upt.ro/~E_INSTR

2. XYZ of Oscilloscopes – www.tektronix.com

3. J. G. Webster (Editor in chief) – Measurement, instrumentation and sensors handbook, CRCnetBase, 1999

4. W. Boyes (Editor in chief) – Instrumentation reference book, Butterworth-Heinemann, 2003

5. H. S. Kalsi – Electronic instrumentation, Tata McGraw-Hill Publishing Company Limited, 2009

6. T. Jurca, D. Stoiciu, S. Mischie – Aparate electronice de măsurat, Ed. Orizonturi Universitare, Timişoara, 2001

8.2 Applied activities[10]	No. of hours	Teaching methods
Introduction. Exercises	4	Topics exposure, discussions, questions, solving problems
Analog oscilloscope. Digital oscilloscope	6	Identification of devices and instrumentation, experimental achieve,

[9] 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.

[10] 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:".

		use specific functions, noting the measurements, processing results
Digital multimeter. Temperature measurement	4	-ll-
Virtual instrumentation	2	-ll-
Signal generator	2	-ll-
Pulse generator	2	-ll-
Counter – timer	2	-ll-
Spectrum analyzer	2	-ll-
Practical tests	4	Do specific tasks with the studied instrumentation
Bibliography [11] http://www.meo.etc.upt.ro/index.php?pag=ei_lab https://intranet.etc.upt.ro/~E_INSTR		

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

- Knowledge concerning the construction and especially the functioning of the measuring and testing instruments are needed in all technical areas

10. Evaluation

Type of activity	**10.1** Evaluation criteria	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	- Solving problems of small, medium and large complexity - Knowledge of the concepts and methods handed over	Written exam Written exam	25% 25%
10.5 Applied activities	**S:**		
	L: Solving Problems corresponding to the laboratory work Practical test	Presentation of the solutions, answers to questions Practical solving of some specific tasks	25% 25%
	P:		
	Pr:		

[11] At least one title must belong to the staff teaching the discipline.

10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified)
• Course work and laboratory activity is assessed by a grade between 1 and 10. The minimum standard of performance involves obtaining grade 5 to each activity. • Knowledge of course is assessed by written examination. For the laboratory, the assessment is made at each lab session and a practical test at the end of the semester.

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
20.12.2016	.....	.....

Head of Department (signature)	**Date of approval in the Faculty Council**[12]	**Dean (signature)**
.....		.....

[12] Avizarea este precedată de discutarea punctului de vedere al board-ului de care aparţine programul de studiu cu privire la fişa disciplinei.