Course file
Scholar Year 2019-2020

Dean,
Prof.Dr.Ing. Daniela Tărniceriu

1. Program info

1.1 Higher education institution	"Gheorghe Asachi" Technical University of Iaşi
1.2 Faculty / Department	Electronics, Telecommunications and Information Technology
1.3 Department	Fundamentals of Electronics
1.4 Field	Electronic Engineering, Telecommunications and Information Technologies
1.5 Study level[1]	Bachelor
1.6 Study program / Qualification	Telecommunications Technologies and Systems

2. Course info

2.1 Course name/Code				Electronic and telecommunications measurements/EDID205			
2.2 Course coordinator				Prof. Cristian ZET			
2.3 Applications coordinator				Prof. Cristian ZET			
2.4 Zear of study[1]	2	2.5 Semester[2]	4	2.6 Assessment type[3]	E	2.7 Course type[4]	DID

3. Total estimated time (hours per semester)

3.1 Number of hours per week	3	3.2 lecture	3	3.3a seminar		3.3b laboratory	1	3.3c project	
3.4 Total number of hours[5]	42	3.5 lecture	28	3.6a seminar		3.6b laboratory	14	3.6c project	

Time distribution[6]	Nr. ore
Textbook, course support, references and course notes study	28
Library, electronic platforms and on site documentation	10
Seminar/laboratory preparation, homework, reports, portfolios and essays	18
Tutoring[6]	4
Assessment[7]	2
Other activities:	

3.7 Total individual study hours[8]	62
3.8 Total hours per semester[9]	104
3.9 Number of credit points	4

4. Prerequisites (where applicable)

4.1 curricula type[10]	• Physics • Fundamental of electrical engineering 1, 2 • Signals, Circuits and Systems 1 • Electronic devices
4.2 competence type	•

5. Infrastructure (where applicable)

5.1 for lectures[11]	• Blackboard • Video-projector • Measuring instruments and standards
5.2 for laboratories[12]	• Measuring instruments • Standards • Wires and coaxial cables • Power supplies • Signal generators

6. Specific competences [13]

			Credits[14]: 4	Credit repartition per competence[15]
Professional competences	CP1	The ability to use fundamental knowledge regarding electronic devices, analog and digital circuits and instrumentation.		1
	CP2	The capacity to apply, in specific situations, the basic methods of electric and non-electric analog and digital signal processing; implementation based on microcontrollers, digital signal processors and specific software		1
	CP3			
	CP4			
	CP5			
	CP6			

	CPS1	Design and analysis of circuits, systems and communications networks, involving processes of acquisition, conversion, transmission, security, transfer and reception of information;	1
	CPS2	Configuration, implementation, testing, operation and maintenance of communications systems and networks and applications development;	0.5
Transversal competences	CT1	Ability to effectively communicate in written, oral and poster format;	0.125
	CT2	Skills of computer use, information technology and specific equipments;	0.125
	CT3	Capacity to document, research and develop specialized studies	0.125
	CTS	Capacity to continue education and develop professional competences.	0.125

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

7.1 Course main objective	• The course "Electric and electronic measurements" is dedicated to studying and for practice of measurement of the main electric quantities. The balance in studying of this domain is realized between the necessary background knowledge about the physical quantities and the measurement methods based on dedicated measurement instruments and systems, also between the electric, electronic and computer based techniques.
7.2 Course specific objectives	• Increasing of the students capacity in understanding the measurement process as an essential link in studying of all phenomena. • Developing their ability in investigation and knowing of the reality with small disturbance. • To appreciate in a quantitative manner the correlation degree between measured values and true values, the significance of the errors in an experiment and to accept the uncertainties as inherent. • The design of the instruments based on electronic devices and tools as well as the understanding and modeling of the instrumentation set-up able to measure electrical quantities.

8. Contents

8.1 Course[16]	Teaching methods[17]	Notes
Fundamentals of Metrology	Academic lecture and oral and video presentation and experiment support	4 hours
Signal converters used in instrumentation		4 hours
Voltage measurements		6 hours
Current measurements		2 hours
Power and energy measurements		4 hours
Measurement of the impedance		4 hours
Measurement of the frequency, time and phase		2 hours
Measurement of the signals distortion and spectral distribution		2 hours

Course references:

In English
A. de Sa: Principles of Electronic Instrumentation, E. Arnold, 1990
van Putten A. F. P.: Electronic Measurement Systems, Prentice Hall, 2-nd edition, 1996
Jones L. D., Chin A. F.: Electronic Instruments and Measurements, Prentice-Hall, 1991
Tse F. S.: Measurement and instrumentation in Engineering, Marcel Dekker, 1989
Wolf S., Smith R.F.M.: Student Reference Manual for Electronic Instrumentation Laboratories, Prentice Hall, 1990.
In French
Lang T.T.: Système des mesurés informatisées, Paris, 1992
Paratte P. A.: Systèmes de mesure, Dunod 1986
In Italian
Pisani U.: Misure Elettroniche, Politeko Edizione, Torino, 1999
In Romanian
Antoniu M.: Măsurări electrice şi electronice, vol. I şi II, Ed. Satya, Iaşi 2001
Iliescu C.: Măsurări electrice şi electronice, E.D.P. - Bucureşti 1984
Milea A.: Măsurări electrice: principii şi metode, ET Bucureşti, 1980
Szekely I., Sandu F.: Circuite electronice de conversie a semnalelor analogice si digitale, MatrixRom, Bucureşti, 2001
Vremeră E.: Măsurări electrice şi electronice, vol. I, MatrixRom, Bucureşti, 1998
Vremeră E.,: Măsurări electrice şi electronice, vol. II, MatrixRom, Bucureşti, 2003
Vremeră E., Zet C., Harja C.: Măsurări electrice şi electronice, Îndrumar de laborator, UTI, 1996

8.2a Seminar	Metode de predare[18]	Observaţii
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8.2b Laboratory	**Metode de predare[19]**	**Observaţii**
1. Data acquisition and computing	Laboratory experiments performed by students	2 hours
2. Measurement methods: bridge and compensation methods		2 hours

3. Digital multimeter: study and certification	working together in teams after discussing the theoretical documentation	2 hours
4. The oscilloscope		2 hours
5. Measurement of the impedances		2 hours
6. Signal distortion measurements		2 hours
7. Study of a data acquisition board		2 hours
8.2c Project	Metode de predare[20]	Observaţii
-		
References (seminar / laboratory / project): Vremeră E., Zet C., Harja C.: Măsurări electrice şi electronice, Îndrumar de laborator, UTI, 1996 www.ee.tuiasi.ro/~measure		

9. Course contents corroboration with the expectations of the epistemic community representatives, professional associations and relevant employers in the field of the program [21]

- The course content is in conjunction with the needs of employers in the fields of testing the telecommunication systems
- Special domains as "Metrology" and "Manufacturing of electronic instrumentation" for telecom industry become possible to be approached
- Understanding of a wide range of systems which use the electronic measurements to run in a right manner
- The course is useful to understand knowledge and perform experiments for other disciplines like Signals, Circuits and Systems; Fundamental Electronic Circuits; Electronic Measurement & Control Systems; Digital Signal Processing; Microwaves; Power Electronics; Electronic Technology; Noises in integrated structures and electromagnetic compatibility

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Percentage of final grade
10.4 Lectures	• Acquired theoretical knowledge (quantity, accuracy, accuracy)	Test during semester[22]:	%
		Homework:	%
		Final evaluation: theoretical knowledge and applications	60 % (minimum 5)
10.5a Seminar	• Frequency / relevance of interventions or responses	• Evidence of interventions, portfolio of papers (papers, scientific syntheses)	%
10.5b Laboratory	• Knowing the equipment, how to use specific instruments; evaluating tools or achievements, processing and interpreting results	• Written questionnaire • Oral response • Laboratory workbook (experimental work, reports) • Practical demonstration	40 % (minimum 5)
10.5c Project	• The quality of the project, the correctness of the project documentation, the justification of the chosen solutions	• Self-assessment, presentation and / or project support • Critical evaluation of a project	% (minimum 5)
10.5d Other activities[23]	•	•	% (minimum 5)
10.6 Minimum performance standard[24]			
• Knowledge about the measurement process. • The ability of data-processing for the measurement results. • Knowing the general characteristics of the measuring equipment. • The ability to setting-up a simplified system for measuring an electric quantity.			

Date, 5.09.2019

Course coordinator, Prof. PhD. Eng. Cristian Zet

Application coordinator, Prof. PhD.Eng. Cristian Zet

Approval date, 6.09.2019

Departament Director, Assoc.Prof.PhD.Eng. Luminița Scripcariu

[1] *1-4 penrtru licență, 1-2 pentru master*
[2] *1-8 pentru licență, 1-3 pentru master*
[3] *Examen, colocviu sau VP A/R – din planul de învățământ*
[4] *DF - disciplină fundamentală, DID - disciplină în domeniu, DS – disciplină de specialitate sau DC - disciplină complementară - din planul de învățământ*
[5] *Este egal cu 14 săptămâni x numărul de ore de la punctul 3.1 (similar pentru 3.5, 3.6abc)*
[6] *Între 7 și 14 ore*
[7] *Între 2 și 6 ore*
[8] *Suma valorilor de pe liniile anterioare, care se referă la studiul individual.*
[9] *Suma dintre numărul de ore de activitate didactică directă (3.4) și numărul de ore de studiu individual (3.7); trebuie să fie egală cu numărul de credite alocat disciplinei (punctul 3.9) x 24 de ore pe credit.*
[10] *Se menționează disciplinele obligatoriu a fi promovate anterior sau echivalente*
[11] *Tablă, vidoproiector, flipchart, materiale didactice specifice etc.*
[12] *Tehnică de calcul, pachete software, standuri experimentale, etc.*
[13] *Competențele din Grilele G1 și G1bis ale programului de studii, adaptate la specificul disciplinei, pentru care se repartizează credite (www.rncis.ro sau site-ul facultății)*
[14] *Din planul de învățământ*
[15] *Creditele alocate disciplinei se distribuie pe competențe profesionale și transversale în funcție de specificul disciplinei*
[16] *Titluri de capitole și paragrafe*
[17] *Expunere, prelegere, prezentare la tablă a problematicii studiate, utilizare videoproiector, discuții cu studenții (pentru fiecare capitol, dacă este cazul)*
[18] *Discuții, dezbateri, prezentare și/sau analiză de lucrări, rezolvare de exerciții și probleme*
[19] *Demonstrație practică, exercițiu, experiment*
[20] *Studiu de caz, demonstrație, exercițiu, analiza erorilor etc.*
[21] *Legătura cu alte discipline, utilitatea disciplinei pe piața muncii*
[22] *Se va preciza numărul de teste și săptămânile în care vor fi susținute.*
[23] *Cercuri științifice, concursuri profesionale etc.*
[24] *Se particularizează la specificul disciplinei standardul minim de performanță din grila de competențe a programului de studii, dacă este cazul.*