COURSE GUIDE

Dean, Prof. Daniela Tărniceriu

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: POWER ELECTRONICS						Code: EDiD 311	
2.2 Course organizer (lecturer)		Dorin O. Neacsu					
2.3 Teaching assistants		Dorin O. Neacsu					
2.4 Year of study III		2.5 Semester II		2.6 Assessement Written colloquium		2.7 Type of subject Required (DI)	

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	14
Library, electronic platforms and on site documentation	7
Seminar/laboratory preparation, homework, reports, portfolios and essays	7
Tutoring	4
Assessment	4
Other activities	0

3.7 Total individual study hours	36
3.9 Total hours per semester	78
3. 10 Number of credit points	3

4. Prerequisites (where applicable)

4.1 curricula type	NO
4.2 competence type	NO

5. Infrastructure (where applicable)

5.1. for lectures	○ Students will not show up for lectures or laboratories with turned-on cell phones. Phone calls during class are not allowed as well as leaving the class for taking personal calls. ○ Tardy attendance is not allowed at either lecture or laboratory since this is disruptive for educational process.

5.2. for laboratories	○ The deadline for handing the laboratory report has to be established jointly by student and instructor. Approved delays are allowed in very special cases only.

6. Specific competences

Professional competences	• Knowledge of terminology for design and use of electronic power supplies. • Demonstrated usage of power supply design principles. • Understanding of power supply architecture to be used within telecom systems. • Capacity to analyze and understand various practical situations. • Assume practical decision abilities based on experiment. • Develop a generic strategy for evaluation of power supplies. • Develop abilities for usage of oscilloscope and laboratory power supplies. • Command decision abilities for selection of power supplies. • Identify and chose optimal methods for solving design problems.
Transversal competences	• Prove interest for professional improvement through development of abilities for laboratory equipment usage. • Involvement in interdisciplinary scientific activity, far from the base specialization (telecom). • Participate within projects with practical character.

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

7.1 Course main target	○ Discipline offers general knowledge pertaining the design, selection and operation of power supplies for telecom systems. ○ Discipline has a character of developing general knowledge, interdisciplinary, far from base specialization (telecom).
7.2 Course specific targets	Development of knowledge in ○ Power supplies architecture for telecom systems. ○ Operation of individual power converters for conversion of electrical energy in various forms (alternative or direct current). ○ Selection of power converters based on requirements derived by telecom systems and market.

8. Contents

8. 1 Lectures	**Teaching methods**	**Notes**
1 Architecture of telecom power systems 2 Power semiconductor devices 3 Buck or boost dc/dc converters 4 Isolated dc/dc converters - flyback and push-pull 5 Phase controlled converters 6 Linear voltage regulators 7 Diode rectifiers 8 Power factor correction 9 Single-phase converters 10 Three-phase converters 11 Converters with AC reference 12 Un-interrupted Power Supplies (UPS) 13 PMBus and other specific standards (*Power-on-Ethernet, Power-on-USB*) 14 Colloquium	Lecture, discussions, case studies, interconnection with other disciplines	Video projector, Board
References: Dorin O. Neacsu, Telecom Power Systems, CRC Press, 2017.		
8. 2 Laboratory	**Teaching methods**	**Notes**
Lab EPTc-1 = Buck Converter Lab EPTc-2 = Boost Converter Lab EPTc-3 = Synchronous Conversion Lab EPTc-4 = Linear Voltage Regulator Lab EPTc-5 = Energy storage converter	Experimental laboratory, with specific setup, located within the Industrial Electronics Laboratory	

Lab EPTc-6 = Push-pull converter		

References

- Mihai Lucanu, "Electronică industrială", Editura Iasi, 2004.
- Course notes - available through Moodle internet system.

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

Corelation between the discipline objectives and the goals of the educational plan

- The educational plan shows the discipline "Power Electronics" within the 3rd academic year, 2nd semester, within the License program entitled "Telecom Technologies and Systems". The discipline introduces power supply systems for telecom systems, and it has a structure going down hierarchically from the complexity of the power system architecture to the board's integrated converters. This way, the discipline widens the student's informational horizon and contributes to the formation of a global image on the practice of telecom systems.
- The acquired knowledge contributes to the future engineer's formation for practical and design activities related to modern telecom systems.

Results expressed in cognitive, technical and professional competences

After graduation from this course, the student will benefit from the following competences

- Knowledge of all variants of power supply architecture for telecom systems.
- Understanding of parameters and design data for power supply systems for proper selection of components.
- Knowledge of parameters and technical language specific to telecom power systems.
- Usage of laboratory equipment for investigation of power supply operation.

10. Assessment

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Percentage of final grade
10.4 Lectures	- Rightness and completeness of knowledge - Logic coherence in expression and adequate use o presented knowledge.	Written colloquium	75%
10.5 Laboratory	- Evaluated with respect to a laboratory report containing collected data and comments addressing the inquiries.	Laboratory reports	25%
10.6 Minimum performance standard			
A grade above 5.			

Data completării, 12.09.2019

Semnătura titularului de curs,
Conf.dr.ing. Dorin O. Neacsu

Semnătura titularului de aplicaţii,
Conf.dr.ing. Dorin O. Neacsu

Data avizării în departament,
16.IX.'19

Director departament,
Conf.dr.ing. Luminița Scripcariu