SYLLABUS

1. Data about the program of study

1.1 Institution	Technical University of Cluj-Napoca
1.2 Faculty	Electronics, Telecommunications and Information Technology
1.3 Department	Applied Electronics
1.4 Field of study	Electronics Engineering, Telecommunications and Information Technology
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Applied Electronics
1.7 Form of education	IF-Full time
1.8 Subject code	46.00

2. Data about the subject

2.1 Subject name	Power Supplies						
2.2 Subject area	Theoretical area Methodological area Analysis area						
2.3 Course responsible	Prof. dr. ing. Petreus Dorin - dorin.petreus@ael.utcluj.ro						
2.4 Teachers in charge of applications	S.l. dr. ing. Patarau Toma – toma.patarau@ael.utcluj.ro						
2.5 Year of study	IV	2.6 Semester	1	2.7 Assessment	E	2.8 Subject category	DS DI

3. Estimated total time

3.1 Number of hours per week	4	of which, 3.2 course	2	3.3 applications	2
3.4 Total hours in the curriculum	56	of which, 3.5 course	28	3.6 applications	28
Individual study					Hours
Manual, lecture material and notes, bibliography					30
Supplementary study in the library, online and in the field					4
Preparation for seminars/laboratory works, homework, reports, portfolios, essays					30
Tutoring					3
Exams and tests					2
Other activities……..					

3.7 Total hours of individual study	69
3.8 Total hours per semester	125
3.9 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.2 Competence	Knowledge of electronics, system control and magnetic theory

5. Requirements (where appropriate)

5.1. For the course	Amphitheatre, Cluj-Napoca

5.2. For the applications	Laboratory, Cluj-Napoca

6. Specific competences

Professional skills	**C5 Application of the basic knowledge, concepts and methods from: power electronics, automatic systems, electricity management, electromagnetic compatibility** C5.1 Defining the specific elements that individualize the electronic devices and circuits in the fields of power electronics, automated systems, electricity management, medical electronics, automotive electronics, consumer goods C5.2 Qualitative and quantitative interpretation of the functioning of circuits in the fields of power electronics, automatic systems, electricity management, medical electronics, automotive electronics, consumer goods; operation regarding electromagnetic compatibility C5.5 Designing, using established principles and methods of subsystems of reduced complexity, from the fields of applied electronics: power electronics, automated systems, electricity management, medical electronics, auto electronics, consumer goods
Cross competences	

7. Discipline objectives (as results from the key competences gained)

7.1 General objectives	Development of professional skills in the field of design, simulation and testing of electronic power circuits.
7.2 Specific objectives	1. The assimilation of theoretical knowledge regarding design and simulation of electronic circuits using advanced simulation programs; 2. Obtaining the skills and abilities necessary for implementation and testing of the performance of power electronic circuits. 3. Obtaining the skills to use specific equipment for electronic power converters

8. Contents

8.1 Lecture (syllabus)	Teaching methods	Notes
1. Introduction to power supplies.	Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise,	Use of .ppt presentation, projector, blackboard
2. Rectifiers		
3. Linear regulators		
4. Linear regulators using integrated circuits		
5. The step-down DC-DC converter. Buck converter		
6. The inverting DC-DC converter. Buck-boost converter		
7. The step-up DC-DC converter. Boost converter		

8. Flyback converter		
9. Forward converter		
10. Push-pull converter		
11. Half-bridge converter		
12. Control of power supplies		
13. Magnetic components design		
14. Noise end electromagnetic compatibility in power supplies		
References 1. Dorin Petreuş - Electronica surselor de alimentare-Editura Mediamira, Cluj-Napoca, 2002 2. Power supplies – a practical approach, Dorin Petreus, Toma Patarau, Radu Etz, editura Mediamira Cluj-Napoca, 2016, ISBN: 978-973-713-333-5		
8.2 Applications	Teaching methods	Notes
1. Laboratory description. Laboratory protection measures.	Didactic and experimental proof, didactic exercise, team work	Use of laboratory instrumentation, experimental boards, computers, white/magnetic board
2. Rectifiers		
3. Linear regulators		
4. Linear regulators using integrated circuits		
5. The step-down DC-DC converter. Buck converter		
6. The inverting DC-DC converter. Buck-boost converter		
7. The step-up DC-DC converter. Boost converter		
8. Flyback converter		
9. Forward converter		
10. Push-pull converter		
11. Half-bridge converter		
12. Self-oscillating flyback converter		
13. Self-oscillating flyback converter with current transformer		
14. Self-oscillating push-pull converter		
References Bibliografie 1. D. Petreuş, Ş.Lungu - Surse în comutaţie – îndrumător de laborator, Ed. Mediamira, Cluj-Napoca, 1999. 2. Dorin Petreuş, Toma Patarau, Radu Etz - Power supplies – A practical approach, Mediamira, Cluj-Napoca, 2016, ISBN: 978-973-713-333-5		

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The skills acquired will be required for employees in the following possible occupations according to the COR: electronics engineer, design engineer, research engineer in applied electronics, engineer of research in microelectronics, engineers in electrotechnology, manager of information technology and communications, systems and computer systems engineer, communications engineer, specialists in information technology.

10. Evaluations

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Solving a problem and answering a set of theoretical questions	Written exam	60%

10.5 Applications	Verification of skills and abilities acquired as a result of laboratory activities	Oral examination during the semester	40%
10.6 Minimum standard of performance			

Qualitative level:

Minimal knowledge:

- ✓ Knowledge of the basic operation of the circuits studied
- ✓ Knowledge of the basic operation of studied power converters

Minimal competences:

- ✓ To be able to describe the functionality of the main power converters
- ✓ To be able to choose the proper power converters in specific applications

Quantitative level:

- ✓ Participation to all applications and laboratories
- ✓ The final exam and laboratory grades to be higher than 5
- ✓ The final grade is calculated as follows: 0.6*Exam grade+0.4*laboratory grade

Date of filling in	Responsible	Title, Name Surname	Signature
24.06.2024	Course	Prof. Dr. Ing. Dorin Petreuș	
	Applications	S.L. Dr. Ing. Pătărău Toma	
		Asist drd. Mirela Olteanu	

Date of approval in the Department of Applied Electronics

28.06.2024

Head of Department
Prof. Dorin PETREUS, PhD Eng.

Date of approval in the Council of Faculty of Electronics, Telecommunications and Information Technology

11.07.2024

Dean
Prof. Ovidiu Aurel POP, PhD Eng.