Universitatea Națională de Știință și Tehnologie Politehnica București
Facultatea de Electronică, Telecomunicații și
Tehnologia Informației

COURSE DESCRIPTION

1. Program identification information

1.1 Higher education institution	**National University of Science and Technology Politehnica Bucharest**
1.2 Faculty	**Electronics, Telecommunications and Information Technology**
1.3 Department	**Telecommunications**
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technology
1.5 Cycle of studies	Masters
1.6 Programme of studies	Electric Vehicle Propulsion and Control

2. Date despre disciplină

2.1 Course name (ro) (en)				Controlul fără senzori al mașinilor electrice Sensorless Control of Electrical Machines			
2.2 Course Lecturer				Conf. Dr. Mihai Stanciu			
2.3 Instructor for practical activities				Conf. Dr. Mihai Stanciu			
2.4 Year of studies	2	2.5 Semester	I	2.6. Evaluation type	V	2.7 Course regime	Ob
2.8 Course type		DS	2.9 Course code	UPB.04.M3.O.24-24		2.10 Tipul de notare	Nota

3. Total estimated time (hours per semester for academic activities)

3.1 Number of hours per week	4	Out of which: 3.2 course	2.00	3.3 seminary/laboratory	2
3.4 Total hours in the curricula	56.00	Out of which: 3.5 course	28	3.6 seminary/laboratory	28
Distribution of time:					hours
Study according to the manual, course support, bibliography and hand notes Supplemental documentation (library, electronic access resources, in the field, etc) Preparation for practical activities, homework, essays, portfolios, etc.					40
Tutoring					0
Examinations					4
Other activities (if any):					0

3.7 Total hours of individual study	44.00
3.8 Total hours per semester	100
3.9 Number of ECTS credit points	4

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	N/A
4.2 Results of learning	N/A

5. Necessary conditions for the optimal development of teaching activities (where applicable)

5.1 Course	N/A
5.2 Seminary/ Laboratory/Project	N/A

6. General objective *(Reffering to the teachers' intentions for students and to what the students will be thought during the course. It offers an idea on the position of course in the scientific domain, as well as the role it has for the study programme. The course topics, the justification of including the course in the currcula of the study programme, etc. will be described in a general manner)*

Study of sensorless control methods for electrical motors

7. Competences *(Proven capacity to use knowledge, aptitudes and personal, social and/or methodological abilities in work or study situations and for personal and proffesional growth. They refflect the empolyers requirements.)*

Specific Competences	competencies regarding sensorless control methods for electrical motors
Transversal (General) Competences	electrical engineering, programming of microcontrollers

8. Learning outcomes *(Synthetic descriptions for what a student will be capable of doing or showing at the completion of a course. The learning outcomes reflect the student's acomplishments and to a lesser extent the teachers' intentions. The learning outcomes inform the students of what is expected from them with respect to performance and to obtain the desired grades and ECTS points. They are defined in concise terms, using verbs similar to the examples below and indicate what will be required for evaluation. The learning outcomes will be formulated so that the correlation with the competences defined in section 7 is highlighted.)*

Knowledge	*The result of knowledge aquisition through learning. The knowledge represents the totality of facts, priciples, theories and practices for a given work or study field. They can be theoretical and/or factual.* competencies regarding sensorless control methods for electrical motors
Skills	*The capacity to apply the knowledge and use the know-how for completing tasks and solving problems. The skills are described as being cognitive (requiring the use of logical, intuitive and creative thinking) or practical (implying manual dexterity and the use of methods, materials, tools and intrumentation).* skills regarding sensorless control methods for electrical motors
Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* The student's capacity to autonomously and responsably apply their knowledge and skills.

9. Teaching techniques *(Student centric techniques will be considered. The means for students to participate in defining their own study path, the identification of eventual fallbacks and the remedial measures that will be adopted in those cases will be described.)*

Student centric techniques

10. Contents

COURSE		
Chapter	**Content**	**No. hours**
1	Stepper motors	4
2	IGBTs	4
3	Inverters	4
4	Sensorless control	16
	Total:	28
Bibliography: J.F.Gieras, J.X. Shen, Modern Permanent Magnet Electric Machines, Theory and Control, CRC Press, 2003 http://ham.elcom.pub.ro		

LABORATORY		
Crt. no.	**Content**	**No. hours**
1	Stepper 1	2
2	Stepper 2	2
3	Inverter 1	2
4	Inverter 2	2
5	Sensorless drives 1	2
6	Sensorless drives 2	2
7	Sensorless drives 3	2
	Total:	
Bibliography: ham.elcom.pub.ro		

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	exam	written test	50
11.5 Seminary/laboratory/project		grades	50
11.6 Passing conditions			
minim 50% in total			

12. Corroborate the content of the course with the expectations of representatives of employers and representative professional associations in the field of the program, as well as with the current state of knowledge in the scientific field approached and practices in higher education institutions in the European Higher Education Area (EHEA)

The contents are corroborated with the industry.

Date Course lecturer Instructor(s) for practical activities

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Conf. Dr. Mihai Stanciu Conf. Dr. Mihai Stanciu

Date of department approval	Head of department
27.10.2024	Conf. Dr. Serban Georgica Obreja
Date of approval in the Faculty Council	Dean
25.10.2024	Prof. Dr. Mihnea Udrea