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	**Applied Electronics and Information Engineering**
1.4 Domain of studies	Electronic Engineering, Telecommunications and Information Technology
1.5 Cycle of studies	Masters
1.6 Programme of studies	Applied Electronics and Informatics

2. Date despre disciplină

2.1 Course name (ro) (en)				Bazele electronicii auto			
2.2 Course Lecturer				Prof. Dr. Alexandru VASILE			
2.3 Instructor for practical activities				Prof. Dr. Alexandru VASILE			
2.4 Year of studies	1	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.M1.O.01-04		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	2.5	Out of which: 3.2 course	1.50	3.3 seminary/laboratory	1
3.4 Total hours in the curricula	35.00	Out of which: 3.5 course	21	3.6 seminary/laboratory	14
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.					10
Tutoring					10
Examinations					4
Other activities (if any):					20

3.7 Total hours of individual study	65.00
3.8 Total hours per semester	100
3.9 Number of ECTS credit points	4

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	Completion and/or promotion of the following disciplines: Physics Basics of electrical engineering Passive components and circuits MICROCONTROLLERS
4.2 Results of learning	Accumulation of the following knowledge: Applying, in concrete situations, the basic methods of acquiring and processing signals and ordering some actuators: The use of specific methods and tools for measuring physical quantities; The use of software environments for the analysis and digital processing of information from a modern vehicle

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

5.1 Course	Completion and/or promotion of the following disciplines: The course will take place in a room equipped with video projector and computer.
5.2 Seminary/ Laboratory/Project	Completion and/or promotion of the following disciplines: The laboratory will take place in a room with specific equipment, which must include: specific car platforms Automotive actuators Sensors specific to the automotive industry

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)*

The discipline familiarizes the students with the general techniques of collecting and analyzing the signals that can be captured at the sensors of interest necessary for making decisions and with their implementation using general purpose (C, C++) or dedicated software development environments. Real phenomena are analyzed, exemplifying through systems and industrial applications typical of the automotive industry, but also of other industries. The discipline addresses as a specific topic the following basic/advanced notions, specific concepts and principles, all of which contribute to the transmission/formation to/of students of an overall vision on the methodological and procedural benchmarks related to the field.

The applications familiarize students with the implementation of general data collection methods on specific physical phenomena, with a dedicated software development environment (Matlab or Simulink). The following are especially taken into account:

- familiarization with data processing techniques through iterative methods specific to the automotive field;

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	Prove that you own basic/advanced knowledge of automotive electronics

Transversal (General) Competences	Work in a team and communicate effectively, coordinating his efforts with others to solve problem situations of medium complexity. Autonomy and critical thinking: the ability to think in scientific terms, to search and analyze data independently, as well as to draw and present conclusions / identify solutions. Ability to analyze and synthesize : presents the acquired knowledge in a synthetic way, as a result of a systematic analysis process. Respect the principles of academic ethics: in the documentation activity correctly cite the bibliographic sources used. Put into practice elements of emotional intelligence in the adequate socio-emotional management of real-life/academic/professional situations, demonstrating self-control and objectivity in decision-making or stressful situations. Honorable, responsible, ethical behavior in the spirit of the law to ensure the reputation of the profession

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.* General notions and technical parameters of car subassemblies. General operating conditions of electrical and electronic equipment on motor vehicles. Mechanical and climatic conditions specific to the car. The technical parameters of a spark ignition engine, existing physical quantities in the automotive field, primary sensors, intelligent sensors= Defines:The electrical energy supply system of the automobile =Primary sources of electrical energy supply on motor vehicles .= Electronic measuring circuits and their supervision. =Power generators, electronic voltage regulators, switching adapters of the electric power supply system on vehicles.
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).* That's not the case

Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* Select appropriate bibliographic sources and analyze them. Respect the principles of academic ethics, correctly citing the bibliographic sources used. Demonstrate responsiveness for new learning contexts. Show collaboration with other colleagues and teaching staff in carrying out teaching activities Demonstrate autonomy in the organization of the learning situation/context or the problem situation to be solved It shows social responsibility through active involvement in student social life/involvement in academic community events Promotes/contributes through new solutions related to the specialized field to improve the quality of social life. He realizes the value of his contribution to the field of engineering to the identification of viable/sustainable solutions to solve problems in social and economic life (social responsibility). Apply principles of professional ethics/deontology in the analysis of the technological impact of the proposed solutions in the specialized field of the environment. Analyze and capitalize on business opportunities / of entrepreneurial development in the specialty field. demonstrate real-life situation management skills (time management, collaboration vs. conflict)..

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.)*

Starting from the analysis of the students' learning characteristics and their specific needs, the teaching process will explore both expository (lecture, exposition) and conversational-interactive teaching methods, based on discovery learning models facilitated by direct exploration and indirect way of reality (experiment, demonstration, modelling), but also on action-based methods, such as exercise, practical activities and problem solving.

In the teaching activity, lectures will be used, based on Power Point presentations or various videos that will be made available to the students. Each course will begin with the recapitulation of the chapters already covered, with an emphasis on the concepts covered in the last course.

Presentations use images and diagrams so that the information presented is easy to understand and assimilate.

This discipline covers information and practical activities designed to support students in their learning efforts and the development of optimal collaborative and communication relationships in a climate conducive to learning through discovery.

It will be considered the practice of active listening and assertive communication skills, as well as feedback construction mechanisms, as ways of regulating behavior in various situations and adapting the pedagogical approach to the students' learning needs.

Teamwork skills will be practiced to solve different learning tasks.b g

10. Contents

COURSE		
Chapter	**Content**	**No. hours**
1	General notions and technical parameters of car subassemblies. General operating conditions of electrical and electronic equipment on vehicles. Mechanical and climatic conditions specific to the automobile. Technical parameters of a spark-ignition engine, existing physical quantities in the automotive field, primary sensors, intelligent sensors	3
2	The electrical energy supply system of the automobile. 2.1. Primary sources of electric energy supply for motor vehicles. Electronic circuits for measurement and their supervision. 2.2 Power generators, electronic voltage regulators, adapters in the commutation of the electric power supply system on vehicles.	3
3	Electronic circuits specific to the automotive field. 3.1. Starting systems: classification, component elements, characteristic sizes, calculation elements, their testing and verification. 3.2. Lighting, signaling and warning systems: component elements, specific electronic circuits, operation, maintenance. 3.3. Board indicator elements. 3.4. Equipment dedicated to the car environment. 3. 3.5. Actuators in car electronics.	5
4	Classical electronic ignition systems: elements	2
5	Principles and methods of electronic control of engine operation	2
6	Modern electronic systems (based on microprocessors, microcontrollers) command and control the operation of an engine: types, advantages, disadvantages, malfunction limits.	2
7	Vehicle testing and checking equipment. 7.1. Equipment for checking and diagnosing the engine and on-board computer. 7.2. Equipment for checking and diagnosing the running system, presence in traffic and passenger protection	2
	Total:	21

Bibliography:

1) Al. VASILE, Irina BACIS, Bazele electronicii auto, Editura Cavallioti, Bucuresti 2013.
2) P. SVASTA, Al. VASILE, Componente Electronice Pasive, Ed.Cavallioti, Bucuresti 2011
3) situl masterului TAEA www.taea.ro , si w.elen-romania.org
4) Robert Bosch GmbH Automotive Electrics, Automotive Electronics System and components Ed 5 ,Editura John Wiley & Sons Ltd. Germany 2007

LABORATORY		
Crt. no.	**Content**	**No. hours**
1	Utilizarea senzorilor primari, senzori inteligenţi:temperatura; umiditate; debit; turatii	4
2	Electronic voltage regulators, switching adapters of the electrical energy supply system on vehicles	2
3	Lighting, signaling and warning systems: component elements	2

4	The operation of the on-board indicator elements	2
5	Electronic ignition systems	2
6	Final laboratory colloquium	2
	Total:	14

Bibliography:

1) Al. VASILE, Irina BACIS, Bazele electronicii auto, Editura Cavallioti, Bucuresti 2013.
2) P. SVASTA, Al. VASILE, Componente Electronice Pasive, Ed.Cavallioti, Bucuresti 2011
3) situl masterului TAEA www.taea.ro , si w.elen-romania.org
4) Robert Bosch GmbH Automotive Electrics, Automotive Electronics System and components Ed 5 ,Editura John Wiley & Sons Ltd. Germany 2007

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course	Do homework	Required homework	40%
	Exam based on a topic of your choice	Presentation ppt	40%
11.5 Seminary/laboratory/project	Colloquy	Practice test	20%
11.6 Passing conditions			
Obtaining 50% of the total score.			

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)

Through the activities carried out, students develop skills to offer solutions to problems and propose ideas to improve the situation of existence in the abc field, the industrial branch

In the development of the content of the discipline, knowledge / aspects / phenomena described in the specialized literature / own researches published / presented etc. were taken into account.

The course has a similar content to the courses held by abc university in abc.

The abc activities aim to develop the graduate's skills to manage practical situations that he may face in real life in order to increase his contribution to the improvement of the socio-economic environment.

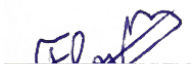
Date	Course lecturer	Instructor(s) for practical activities
10.10.2024	Prof. Dr. Alexandru VASILE	Prof. Dr. Alexandru VASILE

Universitatea Națională de Știință și Tehnologie Politehnica București

Facultatea de Electronică, Telecomunicații și

Tehnologia Informației

Date of department approval	Head of department
29.10.2024	Conf. Dr. Bogdan Cristian FLOREA



Date of approval in the Faculty Council	Dean
25.10.2024	Prof. Dr. Mihnea Udrea