Universitatea Naţională de Ştiinţă şi Tehnologie Politehnica Bucureşti
Facultatea de Electronică, Telecomunicaţii şi
Tehnologia Informaţiei

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	Bachelor/Undergraduate
1.6 Programme of studies	Technologies and Telecommunications Systems

2. Date despre disciplină

2.1 Course name (ro) (en)				Bazele electrotehnicii 2 Fundamentals of Electrical Engineering 2			
2.2 Course Lecturer				Conf. Dr. Oana Mihaela Drosu			
2.3 Instructor for practical activities				Conf. Dr. Oana Mihaela Drosu			
2.4 Year of studies	1	2.5 Semester	2	2.6. Evaluation type	E	2.7 Course regime	Ob
2.8 Course type		D	2.9 Course code	04.D.02.O.012		2.10 Tipul de notare	Nota

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

3.1 Number of hours per week	3	Out of which: 3.2 course	2	3.3 seminary/laboratory	1
3.4 Total hours in the curricula	42	Out of which: 3.5 course	28	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.					
Tutoring					
Examinations					
Other activities (if any):					

3.7 Total hours of individual study	58.00
3.8 Total hours per semester	100
3.9 Number of ECTS credit points	4

4. Prerequisites (if applicable) (where applicable)

4.1 Curriculum	Parcurgerea şi/sau promovarea următoarelor discipline: · Algebră şi analiză vectorială; · Fizica I , Geometrie · Bazele Electrotehnicii 1 Completing and / or promoting the following subjects: · Math: Vector calculus, vector analysis, differential equations. Geometry. · Physics: Electricity, magnetism, Maxwell equations, Fundamentals of Electrical Engineering 1
4.2 Results of learning	· Acumularea de cunostiinte din disciplinele mentionate anterior

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

5.1 Course	Cursul se va desfăşura într-o sală dotată cu tabla si videoproiector şi computer. Capacitatea salii peste 120 locuri. The course will take place in a room equipped with blackboard, video projector and computer. Capacity of the room: over 120 seats
5.2 Seminary/ Laboratory/Project	· Seminarul necesita sală dotată cu tabla si videoproiector şi computer. The seminar will take place in a room equipped with blackboard, video projector and computer . Classroom capacity over 30 seat

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)*

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	Corelează cunoştinţele Aplică în practică cunoştinţele Aplică metode şi instrumente standardizate, specifice domeniului, pentru realizarea procesului de evaluare şi diagnoză a unei situaţii, în funcţie de problemele identificate/raportate, şi identifică soluţii. Argumentează si analizează coerent şi corect contextul de aplicare a cunostinţelor de bază ale domeniului, utilizând concepte cheie ale disciplinei şi metodologia specifica. Comunicare orală şi în scris în limba română: utilizează vocabularul ştiinţific specific domeniului, în vederea comunicării eficace, în scris şi oral. Comunicare orală şi în scris într-o limba străină (engleză): demonstrează înţelegerea vocabularului aferent domeniului, într-o limbă străină. It applies standardized methods and tools, specific to the field, to carry out the evaluation and diagnosis process of a situation, depending on the identified/reported problems, and identifies solutions. It argues and analyzes coherently and correctly the context of application of the basic knowledge of the field, using key concepts of the discipline and the specific methodology. Oral and written communication in Romanian: uses the scientific vocabulary specific to the field, in order to communicate effectively, in writing and orally. Oral and written communication in a foreign language (English): demonstrates understanding of subject-related vocabulary in a foreign language.
Transversal (General) Competences	Lucrează în echipă şi comunică eficient, coordonându-şi eforturile cu ceilalţi pentru rezolvarea de situaţii problemă de complexitate medie. Autonomie şi gândire critică: abilitatea de a gândi în termeni ştiinţifici, de a căuta şi analiza date în mod independent, precum şi de a desprinde şi prezenta concluzii / identifica soluţii. Capacitate de analiză şi sinteză: prezintă în mod sintetic cunoştinţele dobândite, ca urmare a unui proces de analiză sistematică.Identification, description and implementation of project management processes by taking different roles in the team and by description of the results in clear and concise verbal and written form, in a foreign language. Demonstrating the spirit of initiative and action to update the professional, economic and organizational culture knowledge.

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.* **Enumeră** cele mai importante etape care au marcat dezvoltarea domeniului/ can list the most important stages that marked the development of the field **Explică** noţiuni specifice domeniului./ explaines domain-specific notions **Recunoaşte** noţiuni/procese/fenomene/structuri./ **Recognizes / classify concepts** / processes / phenomena / structures. · **Răspunde la întrebări./ Answers to questions** **Compară noţiuni /compares notions**
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).* **Selectează** şi **grupează** informaţii relevante într-un context dat./ **Select** and **group** relevant information in a given context. **Utilizează argumentat principii specifice teoriei campului elecromagnetic. /Use specific principles for the purpose of the theory of electromagnetic field..** **Creează un text ştiinţific. /Develops a scientific text.** · **Formulează puncte de vedere / Express points of view** · **Interpretează** adecvat relaţii de cauzalitate. /Interpretation of causal relationships. · **Identifică soluţii** şi **propune** planuri de rezolvare/proiecte. /Identify solutions and proposes resolution plans/projects. · **Formulează puncte de vedere şi concluzii la experimentele realizate. /Formulate conclusions based on the conducted experiments.Anticipează etapele**/modurile de rezolvare. /Provide arguments for the identified solutions/ways of resolving.

Responsability and autonomy	*The student's capacity to autonomously and responsably apply their knowledge and skills.* · **Selectează** surse bibliografice potrivite şi le analizează. / Select appropriate bibliographic sources and analyze them. · **Respectă principiile de etică academică,** citând corect sursele bibliografice utilizate. / Respect the principles of academic ethics, correctly citing the bibliographic sources used. · **Demonstrează receptivitate** pentru contexte noi de învăţare. /Demonstrate receptiveness to new learning contexts. · **Manifestă colaborare** cu ceilalţi colegi şi cadre didactice în desfăşurarea activităţilor didactice. /Collaborate with other colleagues and teachers in the conduct of teaching activities. **Demonstrează autonomie** în organizarea situaţiei/contextului de învăţare sau a situaţiei problemă de rezolvat. /Demonstrate autonomy in organizing the learning situation/context or problem situation to be solved. **Manifestă responsabilitate socială** prin implicarea activă în viaţa socială studenţească/implicare în evenimentele din comunitatea academică. /Demonstrate social responsibility through active involvement in student social life/engagement in events in the academic community. · **Conştientizează valoarea contribuţiei sale în domeniul ingineriei** la identificarea de soluţii viabile/sustenabile care să rezolve probleme din viaţa socială şi economică (responsabilitate socială). /Awareness of the value of its contribution in the field of engineering to identifying viable/sustainable solutions to solve problems in social and economic life (social responsibility). · **Aplică principii de etică/deontologie profesională în analiza impactului tehnologic al soluţiilor propuse** în domeniul de specialitate asupra mediului înconjurător. /Apply principles of professional ethics/deontology in the analysis of the technological impact of proposed solutions in the field of expertise on the environment.

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.)*

Pornindu-se de analiza caracteristicilor de învăţare ale studenţilor şi de la nevoile lor specifice, procesul de predare va explora metode de predare atât expozitive (prelegerea, expunerea), cât şi conversative-interactive, bazate pe modele de învăţare prin descoperire facilitate de explorare directa şi indirectă a realităţii (experimentul, demonstraţia, modelarea), dar şi pe metode bazate pe acţiune, precum exerciţiul, activităţile practice şi rezolvarea de probleme.

În activitatea de predare vor fi utilizate scrierea pe tabla, comunicarea orala sau prezentări Power Point care vor fi puse la dispoziţia studenţilor. Fiecare curs va debuta cu recapitularea capitolelor deja parcurse, cu accent asupra noţiunilor parcurse la ultimul curs. Prezentările utilizează si figuri şi scheme, astfel încât informaţiile prezentate să fie uşor de înţeles şi asimilat.

Această disciplină acoperă informaţii şi activităţi menite să-i sprijine pe studenţi în eforturile de învăţare şi de dezvoltare a unor relaţii optime de colaborare şi comunicare într-un climat favorabil învăţării prin descoperire.

Se va avea în vedere exersarea abilităţilor de ascultare activă şi de comunicare asertivă, precum şi a mecanismelor de construcţie a feedback-ului, ca modalităţi de reglare comportamentală în situaţii diverse şi de adaptare a demersului pedagogic la nevoile de învăţare ale studenţilor.

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

Lectures will be used in the teaching activity and they will be based on writing on the blackboard , Power Point presentations that will be made available to students. Each course will begin with a recapitulation of the chapters already covered and with an emphasis on the notions 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 efforts to learn and develop optimal collaborative and communicative relationships in a climate conducive to learning through discovery.

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

10. Contents

Bibliography:

11. Evaluation

Activity type	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.4 Course			
11.5 Seminary/laboratory/project			
11.6 Passing conditions			

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)

Natura fundamentală a disciplinei Bazele Electrotehnicii îi obligă pe titularii de curs să păstreze un contact strâns cu conducerea facultăţii şi cu titularii disciplinelor de specialitate, precum şi cu asociaţiile profesionale din domeniu. Pentru completarea conţinutului şi alegerea metodelor de predare/învăţare, lectorii acestei discipline organizeaza seminarii specifice în cadrul catedrei. În cadrul întâlnirilor cu personalul relevant din domeniul Ingineriei Electronice au fost discutate nevoile şi aşteptările acestora fata de pregatirea studentilor

The fundamental nature of the discipline of Electrical Engineering Fundamentals compel the lecturers to keep a close contact with the faculty leadership and with lecturers of the specialized disciplines, as well as profesional associations. In order to complete the content and to choose the teaching / learning methods the lecturers of this discipline have organised specific seminars within the department. During the meetings with relevant personnel from Electronic Engineering field their needs and expectations have been discussed.

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Date	Course lecturer	Instructor(s) for practical activities
21.09.2026	Conf. Dr. Ing. Oana Mihaela Drosu	Conf. Dr. Ing. Marilena Stanculescu

Date of department approval	Head of department
22.09.2026	Conf. Dr. Serban Georgica Obreja

Date of approval in the Faculty Council	Dean
22.09.2026	Prof. Dr. Mihnea Udrea