1.	**Field of study**	**not applicable**
2.	Faculty	not applicable
3.	Academic year of entry	not applicable
4.	Level of qualifications/degree	not applicable
5.	Degree profile	not applicable
6.	Mode of study	not applicable

7.	**General information about the module**
Module name	**Fundamentals of Physics II - Electricity and Magnetism**
Module code	KN-F-PF2-EM
Number of the ECTS credits	2
Language of instruction	Polish
Purpose and description of the content of education	Podczas warsztatów student zapoznaje się z następującymi zagadnieniami: - Elektrostatyka: Ładunki elektryczne i pola, zasada zachowania ładunku. - Natężenie pola elektrycznego. - Prawo Coulomba. - Energia układu ładunków. Praca w polu elektrostatycznym. Potencjał elektryczny: Różnica potencjałów i potencjał. Kondensatory i pojemność. - Prąd elektryczny, Przewodnictwo elektryczne i prawo Ohma. Opór przewodnika. Prawa Kirchoffa, Siła elektromotoryczna. Obwody elektryczne.- Pole magnetyczne: Definicja i właściwości pola magnetycznego, Indukcja magnetyczna, Siła Lorentza, Prawo Biota-Savarta. Indukcja elektromagnetyczna, indukcja własna i wzajemna. Energia pola magnetycznego. Prąd przemienny: napięcie i natężenie skuteczne. Treści realizowane w ramach modułu są zgodne z aktualną podstawą programową z fizyki obowiązującą w szkole podstawowej i średniej. W czasie rozwiązywania zadań i zagadnień fizycznych stosuje poznane jednostki i potrafi je przeliczać. Do rozwiązywania zadań i zagadnień fizycznych wykorzystuje rachunek wektorowy, różniczkowy i całkowy. Uczy się rozwiązywania równań różniczkowych i stosowania przybliżeń w fizyce. Utrwala wyprowadzone podczas warsztatów wybrane wzory i zapamiętuje przykłady. Uczy się matematycznej i fizycznej interpretacji rozwiązań zadań. W ramach pracy własnej w oparciu o notatki oraz literaturę uzupełniającą dąży do utrwalenia pozyskanej wiedzy. Doskonali umiejętności matematyczne niezbędne do rozwiązywania zadań i problemów w fizyce. Podejmuje próby rozwiązania zadań zaproponowanych przez prowadzącego warsztaty. Utrwala prawa, wzory i przykłady definiujące zjawiska z elektryczności i magnetyzmu.
List of modules that must be completed before starting this module (if necessary)	not applicable

8. Learning outcomes of the module

Code	Description	Learning outcomes of the programme	Level of competenc (scale 1-5)
EM_01	rozumie oraz potrafi korzystać z pojęć fizycznych z zakresu elektryczności i magnetyzmu	KN_NDP_F_U01 KN_NDP_F_U02 KN_NDP_F_W02	5 5 5

EM_02	posiada wiedzę z zakresu: praw elektrostatyki, praw opisujących prąd stały i przemienny, praw magnetyzmu	KN_NDP_F_W02	5
EM_03	zna i rozwiązuje problemy i zadań rachunkowych z elektryczności i magnetyzmu na poziomie podstawowym i rozszerzonym	KN_NDP_F_U04 KN_NDP_F_W06	5 5
EM_04	sporządza wykresy i interpretuje zależności łączące różne wielkości fizyczne	KN_NDP_F_U04	4
EM_05	zna i planuje proste eksperymenty z elektryczności i magnetyzmu oraz wnioskować na podstawie ich wyników	KN_NDP_F_U03 KN_NDP_F_W04 KN_NDP_F_W05	4 4 4
EM_06	zna i odnajduje przykłady poznanych praw z elektryczności i magnetyzmu w otaczającej rzeczywistości oraz wyjaśnia ich rolę	KN_NDP_F_K01 KN_NDP_F_U02 KN_NDP_F_W03	4 4 4

9. Methods of conducting classes

Code	Category	Name (description)
a03	Lecture methods / expository methods	Description *a description of objects, phenomena, processes or people; it involves specifying the structure and characteristic features of the object, phenomenon, or process being described; it is usually accompanied by a demonstration of the described object or by its models, drawings, tables, charts, etc.; a description may take the form of an explanation, classification, justification or comparison*
b01	Problem-solving methods	Problem-based lecture *an analysis of a selected scientific or practical problem accompanied by its assessment and an attempt to provide a solution to the issues presented in the lecture as well as the indication of the consequences of the proposed solution*
b02	Problem-solving methods	Lecture-discussion *transmission of content involving interaction with the lecture audience; discussion of lecture-related issues is one of its elements or constitutes its follow-up*
b04	Problem-solving methods	Activating method – discussion / debate *an exchange of views supported by substantive arguments leading to a clash of different views, a compromise or the identification of common positions; it proceeds according to previously agreed-upon rules regarding the time, manner and turn-taking as well as the principles of civil discourse; a discussion is not a competition but aims at finding the best solutions or presenting different points of view; its varieties include brainstorming, Oxford-style debate, panel discussion, decision tree, conference discussion; a debate is an orderly dispute between supporters and opponents of a viewpoint, usually specialists in the field or pre-selected representatives of a group dealing with a common problem*
c02	Demonstration methods	Video show *reproducing a film or video material in its entirety or in fragments in order to illustrate the content taught in class, to submit it to analysis and evaluation or to use it as an exercise in image perception; a film/video can be a work of art, an illustration (also technical illustration) of a content/phenomenon/object, a private record of an action, a media image, etc.*
c06	Demonstration methods	Demonstration-imitation *a presentation of a model way of performing specific activities accompanied by a commentary; it aims at triggering imitation activities in an individual or in a group of participants observing the activities of the person teaching the course until the right habit is formed through regular exercise; the demonstration-imitation method is combined with a physical practice of activities/behaviours*
c07	Demonstration methods	Screen presentation

		a presentation of synthetic image content using computer graphics, e.g., a series of slides or other multimedia forms, usually accompanied by a commentary; typical components of a screen presentation include text organized into bulleted points, charts, images and animations, sometimes sound effects or music; a multimedia illustration of course content presented in the form of a projected image
d02	Programmed learning methods	Working with a programmed textbook *working with a textbook containing instructional material covering part of or the entire curriculum of the module as well as a formula for studying the content; includes working with a subject textbook, an atlas, a catalogue, a problem book, etc.*
d03	Programmed learning methods	Working with another teaching tool *e.g. using websites in any way or according to the rules set by the teacher; or making use of other subject-specific tools*
e01	Practical methods	Laboratory exercise / experiment *[also conducted as fieldwork] a method of practical application of knowledge; implemented in three stages: the recognition of a problem induced by the task content, the formulation of the problem and the attempt to solve it accompanied by the assessment of the effects; the goal is to acquire skills, abilities and habits, and to consolidate the acquired knowledge so that it becomes operational; the laboratory method assumes greater independence of learners than carrying out an experiment*
e02	Practical methods	Production exercise – workshop *an activity involving the creation of an object/product according to the rules/principles/description provided by the academic teacher acting as the workshop master*
e06	Practical methods	Observation *also conducted as fieldwork; a method of watching phenomena, objects or people in a systematic/planned way in order to gain knowledge about them; perceptual separation of elements of a model action as an element of learning through imitation; a complex system of cognition based on sensory experiences*
e07	Practical methods	Simulation *an indirect method; imitating reality in order to gain experience approximating a real one; recreating a real-world situation so that its participant can acquire an experience close to the authentic one; work on “replacement” material*
f01	Methods of self-learning	Self-education *a method which involves independent acquisition of knowledge, skills and social competences, extending their scope and quality; complementary to the learning process taking place in class; taking on the task of developing and adjusting qualifications on one’s own; self-study*
f02	Methods of self-learning	Individual work with a text *searching for and acquiring new information using textbooks and other written sources (including their digital versions); searching for texts, selecting fragments for analysis/interpretation, using other texts to solve a problem related to the studied issue*
f03	Methods of self-learning	Conceptual work *a (mainly intellectual) activity carried out independently (or in a selected group) resulting in the creation of a concept, idea or project; creating a plan based on a vision; developing a general outline of a project; producing a simplified sketch of the variant versions of a procedure/product/work*

10. Forms of teaching

Code	Name	Number of hours	Assessment of the learning outcomes of the module	Learning outcomes of the module	Methods of conducting classes
EM_fs_01	workshop	40	course work	EM_01, EM_02, EM_03, EM_04, EM_05, EM_06	a03, b01, b02, b04, c02, c06, c07, d02, d03, e01, e02, e06, e07, f01, f02, f03

11. The student's work, apart from participation in classes, includes in particular:

Code	Category	Name (description)	Is it part of the BUNA?
a01	Preparation for classes	Search for materials and review activities necessary for class participation *reviewing literature, documentation, tools and materials as well as the specifics of the syllabus and the range of activities indicated in it as required for full participation in classes*	No
a02	Preparation for classes	Literature reading / analysis of source materials *reading the literature indicated in the syllabus; reviewing, organizing, analyzing and selecting source materials to be used in class*	No
a03	Preparation for classes	Developing practical skills *activities involving the repetition, refinement and consolidation of practical skills, including those developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)*	No
a04	Preparation for classes	Consulting materials complementary to those indicated in the syllabus *agreeing on materials complementary to those indicated in the syllabus, supporting the implementation of tasks resulting from or necessary for class participation*	Yes
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content *reading through the syllabus and getting acquainted with its content*	No
b02	Consulting the curriculum and the organization of classes	Verification / adjustment / discussion of syllabus provisions *consulting the content of the syllabus, possibly in the presence of the year tutor or members of the class group, and, if necessary, reassessing the provisions concerning special conditions for class participation, e.g., space and time requirements, technical and other requirements, including conditions for participation in classes outside the walls of the university, classes organized in blocks, organized online, etc.*	Yes
b03	Consulting the curriculum and the organization of classes	Consulting the schedule *getting acquainted with the class schedule, possibly in the presence of the year tutor, in order to optimize participation in classes, including those supplementary to the core subjects listed in the pursued study programme*	Yes
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes *devising a task implementation strategy embracing the division of content, the range of activities, implementation time and/or the method(s) of obtaining the necessary materials and tools, etc.*	Yes
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class *exploring the studied content, inquiring, considering, assimilating, interpreting it, or organizing knowledge obtained from the literature, documentation, instructions, scenarios, etc., used in class as well as from the notes or other materials/artifacts made in class*	Yes
d01	Consulting the results of the verification of	Analysis of the corrective feedback provided by the academic teacher on the results of the	Yes

	learning outcomes	verification of learning outcomes *reading through the academic teacher's comments, assessments and opinions on the implementation of the task aimed at checking the level of the achieved learning outcomes*	
d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks *reviewing and selecting tasks and activities enabling the elimination of errors indicated by the academic teacher, their verification or correction resulting in completing the task with at least the minimum passing grade*	Yes

Information on the details of the module implementation in a given academic year can be found in the syllabus available in the USOS system: https://usosweb.us.edu.pl.