1.	**Field of study**	**Biomedical Engineering**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2023/2024 (winter term)
4.	Level of qualifications/degree	first-cycle studies (in engineering)
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	**General information about the module**
Module name	**CAx systems**
Module code	08-IBSI-S1-17-5-SCAx
Number of the ECTS credits	4
Language of instruction	Polish
Purpose and description of the content of education	Opanowanie modułu "Systemy CAx" będzie wymagało zrozumienia pojęcia „technologia CAx” pod którego nazwą kryje się szeroko rozumiane wspomaganie komputerowe różnych dziedzin nauki i przemysłu. Wspomaganie komputerowe, które jest wykorzystywane w procesach projektowych, badawczych i wytwórczych, a do których używa się systemy oprogramowania inżynierskiego CAD/CAM/CAE. W skład systemu CAx (CAD/CAM/CAE) wchodzą następujące główne kategorie oprogramowania: CAD - computer aided design (projektowanie wspomagane komputerowo); CAM - computer aided management (wytwarzanie wspomagane komputerowo); CAE - computer aided enginering (konstruowanie wspomagane komputerowo). Podstawy teoretyczne to przede wszystkim przyswojenie i zrozumienie kluczowych pojęć związanych z przedmiotem, nabycie umiejętności kojarzenia, zastosowania omawianych zagadnień oraz umiejętność wyszukiwania literaturze szczegółowych informacji (przykłady, rozwiązania techniczne, procedury). Wskazany modułu ma charakter typowo inżynierski, gdyż wspomaga praktyczne wykorzystywanie swojej wiedzy i umiejętności w działalności zawodowej. Umiejętności praktyczne nabywa się poprzez analizę przykładowych problemów, a przede wszystkim przez samodzielne wykonywanie ćwiczeń w ramach zajęć, w ramach których wykonywane jest: projektowanie przestrzenne (CAD); analizy kinematyczne i wytrzymałościowe (CAE); definiowanie technologii wytwarzania (CAM).
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)
k_1	Posiada wiedzę z zakresu komputerowego wspomagania w projektowaniu.	W14	3
K_2	Demonstruje standardowe metody, techniki i narzędzia stosowane w systemach CAD/CAM/CAE.	W06	2
K_3	Stosuje informacje z literatury i źródeł elektronicznych dotyczących CAx.	U27	5
K_4	Rozwiązuje proste i złożone problemy inżynierskie.	U24	4
K_5	Analizuje uzyskane wyniki.	U02	3
K_6	Adoptuje istniejące rozwiązania techniczne: urządzenia, obiekty, procesy itp.	U10	4
K_7	Wykonuje prace indywidualne.	U09	3

K_8	Przestrzega zasad stosowanych podczas projektowania obiektów technicznych.	U15	1
K_9	Wykonuje prace indywidualne i zespołowe.	K01	1

9. Methods of conducting classes

Code	Category	Name (description)
a01	Lecture methods / expository methods	Formal lecture/ course-related lecture *a systematic course of study involving a synthetic presentation of an academic discipline; its implementation assumes a passive reception of the information provided*
a05	Lecture methods / expository methods	Explanation/clarification *explication involving the derivation of a predetermined theorem from other, already known ones, in the number of steps specified by the person teaching the course*
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*
d01	Programmed learning methods	Working with a computer *e.g., Webquest; implementation of educational tasks using electronic and digital devices, computer programs and Internet applications; the academic teacher acts as a consultant; students' work is carried out step by step according to the plan laid own by the person teaching the course and following his instructions, and proceeds towards producing the indicated results within the set deadline*
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*

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
k_fs_1	lecture	15	course work	K_2, K_3, K_4, K_5, K_6, K_7, K_8, K_9, k_1	a01
k_fs_2	laboratory classes	30	course work	K_2, K_3, K_4, K_5, K_6, K_7, K_8, K_9, k_1	a05, c06, d01, d03

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*	No

		developed during previous classes or new skills necessary for the implementation of subsequent elements of the curriculum (as preparation for class participation)	
a05	Preparation for classes	Production/preparation of tools, materials or documentation necessary for class participation *developing, preparing and assessing the usefulness of tools and materials (e.g. aids, scenarios, research tools, equipment, etc.) to be employed in class or as an aid when preparing for classes*	No
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*	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*	No
d01	Consulting the results of the verification of learning outcomes	Analysis of the corrective feedback provided by the academic teacher on the results of the 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*	Yes
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.