1.	**Field of study**	**Data Science and Artificial Intelligence**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2025/2026 (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	**Data analysis and visualization**
Module code	W4_DSAI_S1_AWDan
Number of the ECTS credits	5
Language of instruction	Polish
Purpose and description of the content of education	Celem przedmiotu jest zapoznanie studentów z podstawowymi i zaawansowanymi metodami analizy danych oraz technikami ich wizualizacji. W trakcie zajęć poruszane będą zagadnienia związane umiejętnością pracy z różnymi typami danych, przetwarzaniem, eksploracją i właściwą interpretacją danych. Duży nacisk zostanie położony na odpowiednią prezentację zarówno samych danych, jak i wyników otrzymanych analiz. W tym celu studenci zapoznają się z dobrymi praktykami związanymi z wizualizacją danych i zasadami jakie rządzą tworzeniem dobrych (poprawnych) wykresów. Ważnym elementem zajęć będzie tworzenie całościowych (w tym podsumowujących) raportów z przeprowadzanych analiz, tak w postaci pełnej dokumentacji analizy, jak i zaprezentowania jej wyników w formie interaktywnych dashboardów. Wszystkie zagadnienia będą rozważane w kontekście praktycznych zastosowań z naciskiem na umiejętność wyciągania wniosków.
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)
K01	Ma świadomość znaczenia danych, ich analizy i wizualizacji w procesie wnioskowania i podejmowania decyzji.	DSAI_1S_K01	3
K02	Potrafi w przejrzysty sposób prezentować wyniki analizy danych zarówno dla specjalistów, jak i odbiorców bez przygotowania technicznego	DSAI_1S_K02 DSAI_1S_K03	3 2
K03	Ma świadomość potrzeby ciągłego aktualizowania umiejętności z zakresu analizy i wizualizacji danych (zwłaszcza w zakresie użycia przydatnych do tego programów i narzędzi) i zna źródła umożliwiające dalszy rozwój zawodowy i naukowy w tej dziedzinie.	DSAI_1S_K01 DSAI_1S_K03	3 3
U01	Potrafi pracować z danymi stosując odpowiednie techniki przetwarzania i analizy danych.	DSAI_1S_U03	4
U02	Potrafi tworzyć poprawne, czytelne i skuteczne wizualizacje danych.	DSAI_1S_U03	4
U03	Potrafi tworzyć raporty z analizy danych i podsumowania przeprowadzanych analiz.	DSAI_1S_U03 DSAI_1S_U07	4 4
U04	Potrafi korzystać z wykresów i jest krytycznym odbiorcą złych przykładów wizualizacji danych	DSAI_1S_U03	4

U05	Potrafi korzystać z narzędzi do analizy i wizualizacji danych.	DSAI_1S_U03	4
W01	Zna i rozumie pojęcia oraz metody związane z analizą danych.	DSAI_1S_W03	4
W02	Zna metody wizualizacji danych i zasady tworzenia poprawnych wykresów.	DSAI_1S_W03	4
W03	Rozumie potrzebę analizy danych i ich właściwej wizualizacji.	DSAI_1S_W03	4
W04	Rozumie rolę przygotowania danych oraz ich analizy i wizualizacji w wyciąganiu wniosków z danych.	DSAI_1S_W03	2

9. Methods of conducting classes

Code	Category	Name (description)
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*
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*
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*

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
fs_01	laboratory classes	60	course work	K01, K02, K03, U01, U02, U03, U04, U05, W01, W02, W03, W04	a05, d01, e01

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
b01	Consulting the curriculum and the organization	Getting acquainted with the syllabus content	No

	of classes	*reading through the syllabus and getting acquainted with its content*	
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
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*	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.