

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		Linear Algebra and Geometry
Module code		W4_DSAI_S1_ALG
Number of the ECTS credits		5
Language of instruction		Polish
Purpose and description of the content of education		Celem modułu jest zdobycie przez studiującego wiedzy i umiejętności z zakresu algebry liniowej i podstaw geometrii. W czasie zajęć będą poruszane zagadnienia dotyczące m.in. podstawowych struktur algebraicznych takich, jak grupy, pierścienie czy ciała, arytmetyki modularnej czy liczb zespolonych. Ważną częścią zajęć będzie zapoznanie się z pojęciem macierzy, przedstawienie ich kluczowych własności oraz operacji, jakie można na nich wykonywać. W szczególności zostanie zaprezentowane, w jaki sposób obliczać wyznacznik i rząd macierzy, by następnie zastosować tę wiedzę np. w rozwiązywaniu układów równań metodą Gaussa czy Cramera czy w geometrii przy badaniu wzajemnego położenia prostych czy płaszczyzn. Ponadto studenci poznają istotne zagadnienie algebry liniowej, czyli w jaki sposób wyznaczać bazy i wymiary podprzestrzeni liniowych.
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	Dostrzega znaczenie algebry liniowej i geometrii jako narzędzi wspomagających rozwiązywanie problemów w data science i sztucznej inteligencji, rozumie znaczenie dalszego pogłębiania wiedzy oraz jest gotów do korzystania ze wsparcia ekspertów w przypadku trudności w samodzielnym rozwiązywaniu problemów	DSAI_1S_K01	3	
U01	Potrafi rozwiązywać układy równań liniowych metodą Gaussa i Cramera	DSAI_1S_U01	3	
U02	Potrafi obliczać wyznaczniki i rzędy macierzy	DSAI_1S_U01	3	
U03	Potrafi stosować rząd i wyznacznik macierzy w geometrii	DSAI_1S_U01	3	
U04	Potrafi wyznaczać bazy i wymiary podprzestrzeni	DSAI_1S_U01	3	
W01	Zna i rozumie podstawowe pojęcia algebry liniowej i geometrii	DSAI_1S_W01	3	
W02	Zna podstawowe struktury algebraiczne	DSAI_1S_W01	3	
W03	Zna podstawowe własności dotyczące macierzy i operacji na nich	DSAI_1S_W01	3	

9. Methods of conducting classes		
Code	Category	Name (description)
a05	Lecture methods / expository methods	Explanation/clarification <i>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</i>
b08	Problem-solving methods	Activating method – peer learning <i>learning through the exchange of knowledge in a group/team/pair of students, i.e., in the so-called learning cell; a kind of mutual learning; an approach focused on student activity under the guidance of the person teaching the course; a learning situation where students with a similar level of experience learn from one another</i>
d04	Programmed learning methods	Reconstruction / reproduction <i>proceeding according to the indicated/displayed pattern/model; e.g., the reconstruction of a structure, model, image, etc.</i>
e01	Practical methods	Laboratory exercise / experiment <i>[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</i>

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	discussion classes	60	course work	K01, U01, U02, U03, U04, W01, W02, W03	a05, b08, d04, e01

11. The student's work, apart from participation in classes, includes in particular:			
Code	Category	Name (description)	Is it part of the BUNA?
a03	Preparation for classes	Developing practical skills <i>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)</i>	No
b01	Consulting the curriculum and the organization of classes	Getting acquainted with the syllabus content <i>reading through the syllabus and getting acquainted with its content</i>	No
c01	Preparation for verification of learning outcomes	Determining the stages of task implementation contributing to the verification of learning outcomes <i>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.</i>	Yes
c02	Preparation for verification of learning outcomes	Studying the literature used in and the materials produced in class <i>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</i>	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 <i>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</i>	Yes



d02	Consulting the results of the verification of learning outcomes	Development of a corrective action plan as well as supplementary/corrective tasks <i>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</i>	Yes
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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>.