1.	**Field of study**	**Mathematics**
2.	Faculty	Faculty of Science and Technology
3.	Academic year of entry	2024/2025 (winter term)
4.	Level of qualifications/degree	second-cycle studies
5.	Degree profile	general academic
6.	Mode of study	full-time

7.	**General information about the module**
Module name	**Stochastic Methods**
Module code	W4-MT-S2-23-MSto
Number of the ECTS credits	6
Language of instruction	Polish
Purpose and description of the content of education	Celem przedmiotu jest zapoznanie studentów z podstawowymi metodami analizy stochastycznej oraz jej zastosowaniami w matematyce finansowej. Treści programowe: 1.Warunkowa wartość oczekiwana. Momenty stopu. Martyngały. 2.Całka stochastyczna. Wzór Ito. 3.Równania stochastyczne. 4.Zastosowania w matematyce finansowej.
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)
MSto _1	posiada pogłębioną wiedzę z zakresu podstawowych działów matematyki	K_W01	4
MSto _2	dobrze rozumie rolę i znaczenie konstrukcji rozumowań matematycznych	K_W02	4
MSto _3	zna podstawy modelowania stochastycznego w naukach ekonomicznych	K_U07	3
MSto _4	posiada umiejętności wyrażania treści matematycznych, w mowie i na piśmie, w tekstach matematycznych o różnym charakterze	K_U05	4
MSto _5	posiada umiejętność sprawdzania poprawności wnioskowania w budowaniu dowodów formalnych	K_U03	4
MSto _6	zna podstawowe pojęcia i metody procesów stochastycznych i potrafi je stosować w zagadnieniach praktycznych	K_W04	4
MSto _7	rozpoznaje struktury matematyczne w wybranych zagadnieniach matematyki finansowej	K_W04	3
MSto _8	potrafi stosować procesy stochastyczne jako narzędzie do modelowania zjawisk i analizy ich ewolucji	K_U07	4

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*
b08	Problem-solving methods	Activating method – peer learning *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*
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**
MSto_fs_1	lecture	30	course work	MSto _1, MSto _2, MSto _3, MSto _6, MSto _7, MSto _8	a01
MSto_fs_2	discussion classes	30	course work	MSto _1, MSto _2, MSto _3, MSto _4, MSto _5, MSto _6, MSto _7, MSto _8	b08, e01

11.	The student's work, apart from participation in classes, includes in particular:		
Code	**Category**	**Name (description)**	**Is it part of the BUNA?**
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
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	Yes

		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.*	
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 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

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.