Formal Methods in Computer Science

Course Description

Basic Information

Field of Study : Analytical Computer Science

Path : -

Organizational Unit : Faculty of Mathematics and Computer Science

Education Level : first-cycle studies

Form of Studies : full-time studies

Study Profile : general academic

Obligatory Status : mandatory

Education Cycle : 2022/23

Course Code : UJ.WMIIANS.110.03335.22

Languages of Instruction : Polish

Course Related to Scientific Research : Yes

Disciplines : Computer Science, Mathematics

ISCED Classification : 0541 Mathematics, 0613 Software and applications development and analysis

USOS Code : WMI.TCS.MFI.OL

Course Coordinator

Marek Zaionc

Course Instructor

Marek Zaionc

Period Semester 1	Form of verification of learning outcomes exam Form of instruction and hours lecture: 60 tutorials: 60	Number of ECTS credits 10.0

Learning Outcomes for the Course

Code	Effects in terms of	Field-specific learning outcomes	Verification methods
Knowledge – The student knows and understands:			
W1	formal methods in computer science; discrete and probabilistic methods for modeling computer science issues	IAN_K1_W02	written exam, written credit
Skills – The student can:			
U1	apply mathematical knowledge to model simple tasks related to computer science	IAN_K1_U02	written exam, written credit
U2	present correct mathematical reasoning in an understandable way, formulate definitions and theorems	IAN_K1_U01, IAN_K1_U02	written exam, written credit
Social competences – The student is ready to:			
K1	approach with appropriate reservation opinions and statements that have not been sufficiently and correctly justified; precisely formulate questions for the analysis of a given topic	IAN_K1_K01	written exam, written credit

ECTS Credit Balance

Student activity form	Average number of hours* dedicated to completed activity types
lecture	60
tutorials	60
preparation for tutorials	55
exam preparation	28
participation in exam	2

problem solving	55	
Total student workload	Number of hours 260	ECTS 10.0

* hour (lesson) means 45 minutes

Program Content

No.	Program Content	Learning outcomes for the course
1.	Set theory axioms, sum and pair axioms. Cartesian product, relations, equivalence relations, set partitions. Von Neumann construction of natural numbers, induction theorem, definition by induction, well-ordering principle, and the construction of integers, rational and real numbers. Basic theorems of cardinality theory. Theory of ordered sets, linearly ordered sets, well-ordered sets, basic theorems in this area.	W1, U1, U2, K1

Extended Information

Teaching Methods:

conventional lecture, multimedia presentation lecture, problem solving, subject tutorials

Type of classes	Forms of credit	Course completion conditions
lecture	written exam	The exam will be in the form of a test. Admission to the exam test requires obtaining a positive credit. The final grade consists in 50% of points from the previously obtained credit and in 50% of points from the exam test. GRADES FROM THE RESIT EXAM: The resit exam will be in the form of a test. All persons who did not pass the exam and also persons who did not get credit are admitted to the resit exam. The final grade after the resit exam consists in 40% of points previously earned for credit and in 60% of points from the resit exam test. For persons who have not previously earned credit and who want to take the resit test, the final grade after the resit exam also becomes the credit grade.
tutorials	written credit	The credit grade consists of grades from tests 2 x 40p plus 20p for activity in tutorials. Grading scale: from 0 to 50 unsatisfactory; from 51 to 60 satisfactory; from 61 to 70 satisfactory+; from 71 to 80 good; from 81 to 90 good+; from 91 to 100 very good.

Prerequisites and Additional Requirements

NONE

Literature

Required

1. H.Rasiowa, "Wstep do matematyki wspólczesnej", PWN, Warszawa 1971, 1984, 1998
2. K. Kuratowski, A. Mostowski, "Teoria mnogości", PWN, Warszawa, 1978