

FACULTY of Informatics and Management / DEPARTMENT

SUBJECT CARD**Name in Polish:** Teoria obliczeń**Name in English:** Theory of Computation**Main field of study (if applicable):** Informatics**Specialization (if applicable):****Level and form of studies:** 1st/ ~~2nd~~* level, full-time / ~~part-time~~***Kind of subject:** ~~obligatory~~ / optional / ~~university-wide~~***Subject code** INZ0294Wc**Group of courses** YES / ~~NO~~*

	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	30			
Number of hours of total student workload (CNPS)	60	90			
Form of crediting	Examination /crediting with grade*	Examination /crediting with grade*	Examination /crediting with grade*	Examination /crediting with grade*	Examination /crediting with grade*
For group of courses mark (X) final course	X				
Number of ECTS points	2	3			
including number of ECTS points for practical (P) classes	0	0			
including number of ECTS points for direct teacher-student contact (BK) classes	1,2	1,8			

*delete as applicable

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Logic, set theory.
2. Discrete mathematics.
3. Algorithms and data structures.

SUBJECT OBJECTIVES

C1 Introduce basic models of computation.

C2 Prove fundamental limits on computation (the halting problem, incomputability).

SUBJECT EDUCATIONAL EFFECTS

relating to knowledge:

PEK_W01 Student knows basic models of computation.

PEK_W02 Student understands fundamental limits on computation.

PEK_W03 Student understands mathematical proofs.

relating to skills:

PEK_U01 Student is able to make use of formal models, e.g. finite automata, formal grammars.

PEK_U02 Student builds formal models of computation with given properties.

PEK_U03 Student manipulates formal models of computation (minimization, transformation).
 PEK_U04 Student carries out simple proofs.

relating to social competences:

PEK_K01 Students knows the limitations of his/her knowledge and understands the need for further studies.

PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Overview.	2
Lec 2	Reminder of set theory.	2
Lec 3	Formal languages and grammars.	2
Lec 4	Propositional logic.	2
Lec 5	Predicate logic.	2
Lec 6	Predicate logic and induction, cont.	2
Lec 7	Deterministic finite automata.	2
Lec 8	Applications of the Myhill-Nerode theorem.	2
Lec 9	Nondeterministic finite automata.	2
Lec 10	Countability and uncountability.	2
Lec 11	Encoding.	2
Lec 12	Computability.	2
Lec 13	Computability, cont.	2
Lec 14	Written test.	2
Lec 15	Nondeterminism in computability theory.	2
	Total hours	30
Form of classes - class		Number of hours
Cl 1	Administrative class. Grading policy.	2
Cl 2	Set theory.	2
Cl 3	Formal languages and grammars.	2
Cl 4	Formal languages and grammars.	2
Cl 5	Propositional logic.	2
Cl 6	Predicate logic.	2
Cl 7	Predicate logic and induction.	2
Cl 8	Deterministic finite automata.	2
Cl 9	Written test.	2
Cl 10	Applications of the Myhill-Nerode theorem.	2
Cl 11	Nondeterministic finite automata.	2
Cl 12	Countability and uncountability.	2

Cl 13	Encoding.	2
Cl 14	Computability.	2
Cl 15	Computability.	2
	Total hours	30

TEACHING TOOLS USED

N1. Lecture supported by multimedia presentations.
N2. E-learning system used to publish teaching materials and messages.

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F1	PEK_W01 - PEK_W03 PEK_U01 - PEK_U04 PEK_K01	Grading homework exercises solved at classes and declared as solved.
F2	PEK_W01 - PEK_W03 PEK_U01 - PEK_U04	Written tests.
C The overall grade of the course is $(C+T)/2$ rounded off. H is the grade for classes, and T is the grade for two written tests.		

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] Hopcroft J.E., Motwani R., Ullman J.D., Automata Theory, Languages, and Computation, 3rd ed., Pearson 2007.
[2] Rosenberg A.L., The Pillars of Computation Theory. State, Encoding, Nondeterminism, Springer 2009.

SECONDARY LITERATURE:

- [1] M.Sipser, Introduction to the Theory of Computation, 2nd ed., Thomson Course Technology 2006.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR
SUBJECT
Theory of Computation
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY
Informatics
AND SPECIALIZATION

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Programme content***	Teaching tool number***
PEK_W01 (knowledge)	K1INF_W02	C1	Lec1-Lec9	N1, N2
PEK_W02	K1INF_W02	C1, C2	Lec10-Lec13, Lec15	N1, N2
PEK_W03	K1INF_W02	C1, C2	Lec2-Lec15	N1, N2
PEK_U01 (skills)	K1INF_W02	C1	C13-4, C18-11, Lec14	N2
PEK_U02	K1INF_W02	C1	C13-4, C18-11, Lec14	N2
PEK_U03	K1INF_W02	C1	C13-4, C18-11, Lec14	N2
PEK_U04	K1INF_W02	C1, C2	C12-C115, Lec14	N2
PEK_K01 (competences)	K1INF_K01	C2	Lec10-Lec15, C112-C115	N1, N2

** - enter symbols for main-field-of-study/specialization educational effects

*** - from table above