



## COURSE DESCRIPTION CARD- SYLLABUS

Course name

Discrete mathematics

### Course

Field of study

Mathematics in Technology

Area of study (specialization)

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Level of study

first-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

### Number of hours

Lectures

15

Tutorials

15

Laboratory classes

15

Projects/seminars

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Other (e.g. online)

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### Number of credit points

3

### Lecturers

Responsible for the course/lecturer::

prof. dr hab. Ryszard Płuciennik

Responsible for the course/lecturer::

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### Prerequisites

Basic knowledge in domain of calculus, algebra and programming on the level of studies of the first semester.

### Course objective

Ability of creating of mathematical models of concrete situations. Using of IT tools to solving of mathematical problems in discrete mathematics. Mastering of advanced combinatorial models.

### Course-related learning outcomes

Knowledge



- fundamental knowledge in applied and discrete mathematics. Knowledge of basic algorithms. Expertise of algorithm configuration procedures and algorithm implementation to solving of computationally hard problems.

#### Skills

- ability to create mathematical models applied to the description of concrete real situations. Ability of recursive thinking in approaching to combinatorial problems.

#### Social competences

- possessing of awareness of responsibility for unassisted work and willingness to comply with principle of the teamwork and taking responsibility for jointly implemented tasks

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

**Lectures:** valuation of knowledge and skills during written test.

**Tutorials:** systematic control of theoretical knowledge in form of short quizzes. Valuation of student answers during lessons. Valuation of activity during lessons.

**Laboratory classes:** presentation of project with self-written script in MatLab as well as activity of student during classes.

### Programme content

Update: 31.01.2020r.

Mathematical induction principle. Recursive formulas for arithmetic sequences and recursive relations. Fundamental counting principles. Combinatorics. Inclusion-exclusion principle. Binomial method. Problems requiring of the theory of Latin squares. Rook polynomials and their applications. Course illustrated by many examples and counterexamples.

### Teaching methods

**Lectures:** the lecture conducted in an interactive way with formulating questions for a group of students or for selected students.

**Tutorials:** analysing and Solving sample tasks on the board. Posing problems which require a creation of algorithms (individually or as a team) for solving some complicated issues of discrete mathematics. Creating of mathematical models for specific situations in reality.

**Laboratory classes:** practical classes in the computer laboratory.

### Bibliography

#### Basic

- R. L. Graham, D. E. Knuth, O. Patashnik, Matematyka konkretna, PWN, Warszawa 2020.



- K.A. Ross, C.R.B. Wright, Matematyka dyskretna, PWN, Warszawa 2012.

Additional

- T.H. Cormen, C.E. Leiserson, R.L. Rivest, Wprowadzenie do algorytmów, PWN, Warszawa 2012.

**Breakdown of average student's workload**

	Hours	ECTS
Total workload	90	3
Classes requiring direct contact with the teacher	45	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)	45	1,5