Detailed course description
(SUBJECT CARD)

Course title: Discrete mathematics
Course code: WM1
Classification of a course group: Monographic lecture I in English
Course type: course of limited choice
Field of study: **Mathematics**
Level of study: first-cycle
Profile of study: general academic
Mode of study: intramural studies
Specialty (specialisation):   all
Year of study: 2020/2021
Semester: 4
Teaching modes and teaching hours:

> lectures – 30;
> classes – 30;

Language/s of instruction: English
Number of ECTS credits *(according to the study programme)*: **5**

1. Course objectives:

Purpose of the course is to familiarize the students with the basic methods used in discrete mathematics (graph theory)

2. Relation of the field-related learning outcomes to modes of teaching and methods of verification as well as to assessment of student's learning outcomes:

symbol	assumed learning outcomes *a student who completed the course:*	teaching modes	verification methods and learning outcomes assessment
Knowledge: a student knows and understands			
K1A_W02	basic theorems concerning the investigated area of mathematics together with the basic examples and contra-examples illustrating the specific mathematical concepts.	lecture, class	test, oral answer during the class exercises
K1A_W09	selected applications of discrete mathematics.	lecture, class	test, oral answer during the class exercises
Skills: a student can			
K1A_K06	- create some applications in discrete mathematics. - apply the combinatorics tools in solving some problems, - search, on her/his own, the information concerning combinatorics and discrete mathematics in literature, also in foreign languages.	lecture, class	test, oral answer during the class exercises

3. The content of study programme ensuring learning outcomes *(according to the study programme)*:

   Selected problems of discrete mathematics (graph theory).

4. Description of methods of determination of ECTS credits:

Type of activity	Number of hours / ECTS credits
Lecture	30 / 1 ECTS
Class	30 / 1 ECTS
Student's workload – preparation for class	30 / 1 ECTS
Student's workload – preparation of homeworks	30 / 1 ECTS
Student's workload – preparation for test	30 / 1 ECTS
Total hours:	**150**
Number of ECTS credits allocated to a course	**5**

5. Summary indexes:
   - number of course hours and ECTS credits at the course with a direct participation of academic teachers or other persons running the course and supervising students: 150 hours / 5 ECTS

   - number of course hours and ECTS credits at the course related to the scientific activity conducted at the Silesian University of Technology in a discipline or in disciplines to which a field of study is assigned - in the case of studies with a general academic profile: 150 hours / 5 ECTS;

- number of course hours and ECTS credits at the course developing practical skills- in the case of practical studies: 0 hours / 0 ECTS;
- number of course hours conducted by academic teachers employed by the Silesian University of Technology as their primary workplace: 0 hours.

6. Persons conducting particular modes of courses (name, surname, academic degree or degree in arts, title of professor, business e-mail address):

Lecture and exercises: Dr. Frederic Jaffrennou, e-mail: fredjaffr@yahoo.fr

7. Detailed description of teaching modes:

1) lectures:
- detailed programme's content:

Basic concepts and theorems and applications of discrete mathematics (graph theory). Basic logic principles, set theory and functions. Basic properties of graphs. Paths, isomorphism, planarity and dual graphs. Graph coloring, chromatic number. Eulerian and Hamiltonian circuits. Ramsey theory.

- teaching methods, including distance learning:

Lecture conducted traditionally or remotely, depending on Rector's ordinance - in case of the remote form, the lecture will be organized according to the schedule (or in other time consulted with the group of students), synchronously, on-line, with the aid of Zoom platform (login data will be published in the course conducted in the Platform of Remote Education), additional educational materials will be available in the course conducted in the Platform of Remote Education.

- form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:

To pass the lectures student must write the final practical/theoretical test (maximal number of points is 50). The minimal number of points, required to pass the subject, is 15. All students attending the course (having no more than 3 unjustified absences at the exercises) can take the test.

- course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory. The lectures are organized every week and last 2 academic hours. Presence at the lecture is not obligatory, but recommended. Knowledge of issues presented at the lecture is required.

2) exercises:
- detailed programme's content:

Practical realization of the issues, presented during the lectures, on the way of discussing and solving the tasks illustrating the undertaken problems.

- teaching methods, including distance learning:

Our classes will meet through the Zoom or MS Teams conference systems combined with the mandatory Platform of Remote Education. During the lecture, definitions and theorems (mostly with proofs) are stated and all notions are illustrated by examples. On the Platform of Remote Education,presentations and other teaching materials are available before each lecture. The content of lectures is carried out during the classes – students solve (individually, in groups, with the help of teacher if necessary) practical tasks selected by the teacher. An important part of the didactic process is the student's independent work. During lectures and classes, students can ask questions related to the discussed topics.

- form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:

To pass the exercises student must write the final practical/theoretical test (maximal number of points is 50). The minimal number of points, required to pass the subject, is 15. All students attending the course (having no more than 3 unjustified absences at the exercises) can take the test.

- course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory

The exercises are organized every week and last 2 academic hours. Presence at the exercises is obligatory.

8. Description of the method for determining the final grade (rules and criteria for evaluation, as well as the final grade calculation method in the case of a course comprising more than one teaching mode, taking into account all teaching modes and all exam dates and credit tests including retake exams and tests):

There will be two tests organized in the semester: practical one for 40p. and theoretical/practical one for 50p.

Activity during the exercises: 10p.

For passing the course it is required to collect 41 points together including at least 15 points for the theoretical/practical test.

The grade will be given according to the following scale:

41-55 p.: sufficient (3.0)

56-70 p.: plus sufficient (3.5)

71-80 p.: good (4.0)

81-90 p.: plus good (4.5)

91-100 p.: very good (5.0).

9. Method and procedure for making up for

- student's absence from the course,

- differences in study programmes for students changing their field of study, changing university or resuming studies at the Silesian University of Technology,

Student catches up the missing lectures and exercises, and the deficiencies resulting from the program differences, on his/her own on the basis of materials published in the Platform of Remote Education of the Silesian University of Technology, recommended literature and consultations with the teacher.

10. Prerequisites and additional requirements, taking into account the course sequence:

The basic knowledge of the linear algebra, mathematical analysis and differential calculus, as well as the basic knowledge of English language is required.

11. Recommended sources and teaching aids:

1. Bender, Edward A. and S. Gill Williamson, Lectures in Discrete Mathematics.

2. Epp, Susanna S., Discrete Mathematics with Applications, Cengage Learning, 4th edition 2011.

3. Graham, Ronald L. and Donald Knuth and Oren Patashnik, Concrete Mathematics: A Foundation for Computer Science, Addison-Wesley Professional, 1994.

4. Hunter, David J., Essentials of Discrete Mathematics, 2nd Ed, Jones and Bartlett, 2011.

12. Description of teachers' competences (e.g. publications, professional experience, certificates, trainings etc. related to the programme contents implemented as a part of the course):

Dr. Frederic Jaffrennou has four years of experience in leading the courses of various kinds (lectures, exercises, laboratories, seminars), and for students from various faculties, within the scope of mathematics and its applications.

13. Other information:

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