

## Subject card

|                                             |                                                                                                                                                                                                                                                                                |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------|------------|-----|
| Subject name and code                       | Probability Theory, PG_00188876                                                                                                                                                                                                                                                |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
| Field of study                              | Mathematics                                                                                                                                                                                                                                                                    |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
| Date of commencement of studies             | October 2026                                                                                                                                                                                                                                                                   |                                                          | Academic year of realisation of subject                                                                                                                     |                                     | 2028/2029                                      |            |     |
| Education level                             | Bachelor's studies                                                                                                                                                                                                                                                             |                                                          | Subject group                                                                                                                                               |                                     | Obligatory subject group in the field of study |            |     |
| Mode of study                               | full-time studies                                                                                                                                                                                                                                                              |                                                          | Mode of delivery                                                                                                                                            |                                     | at the university                              |            |     |
| Year of study                               | 3                                                                                                                                                                                                                                                                              |                                                          | Language of instruction                                                                                                                                     |                                     | Polish                                         |            |     |
| Semester of study                           | 5                                                                                                                                                                                                                                                                              |                                                          | ECTS credits                                                                                                                                                |                                     | 8.0                                            |            |     |
| Learning profile                            | academic                                                                                                                                                                                                                                                                       |                                                          | Assessment form                                                                                                                                             |                                     | exam                                           |            |     |
| Conducting unit                             | Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector                                                                                                                                                                                          |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
| Name and surname of lecturer (lecturers)    | Subject supervisor                                                                                                                                                                                                                                                             |                                                          | dr hab. Piotr Szuca                                                                                                                                         |                                     |                                                |            |     |
|                                             | Teachers                                                                                                                                                                                                                                                                       |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
| Lesson types                                | Lesson type                                                                                                                                                                                                                                                                    | Lecture                                                  | Tutorial                                                                                                                                                    | Laboratory                          | Project                                        | Seminar    | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                          | 45.0                                                     | 45.0                                                                                                                                                        | 0.0                                 | 0.0                                            | 0.0        | 90  |
|                                             | E-learning hours included: 0.0                                                                                                                                                                                                                                                 |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
| Learning activity and number of study hours | Learning activity                                                                                                                                                                                                                                                              | Participation in didactic classes included in study plan |                                                                                                                                                             | Participation in consultation hours |                                                | Self-study | SUM |
|                                             | Number of study hours                                                                                                                                                                                                                                                          | 90                                                       |                                                                                                                                                             | 4.0                                 |                                                | 106.0      | 200 |
| Subject objectives                          | The aim of the course is to familiarize the student with the basic concepts of probability theory.                                                                                                                                                                             |                                                          |                                                                                                                                                             |                                     |                                                |            |     |
| Learning outcomes                           | Course outcome                                                                                                                                                                                                                                                                 |                                                          | Subject outcome                                                                                                                                             |                                     | Method of verification                         |            |     |
|                                             | [MATL3_W05] knows and understands at an advanced level selected concepts, methods and theorems of probability and statistics, as well as basic examples both illustrating specific concepts in this field and allowing to refute false hypotheses or invalid reasoning         |                                                          | The student knows and understands the basic concepts, theorems and methods of probability calculus.                                                         |                                     | [SW4] test/exam - oral or written              |            |     |
|                                             | [MATL3_W09] knows and understands the role and importance of proof in mathematics, as well as the concept of the importance of assumptions                                                                                                                                     |                                                          | The student knows and understands the basic concepts, theorems and methods of probability calculus.                                                         |                                     | [SW4] test/exam - oral or written              |            |     |
|                                             | [MATL3_U08] can formulate definitions and theorems in an understandable manner, both orally and in writing, and present correct mathematical reasoning on the learned topics                                                                                                   |                                                          | The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables. |                                     | [SU4] test/exam - oral or written              |            |     |
|                                             | [MATL3_U05] is able to correctly use the concepts of probability and statistics, is able to apply the theorems and methods of these fields and is able to interpret the obtained results                                                                                       |                                                          | The student verifies the basic properties of probability spaces and random variables and proves simple facts about probability spaces and random variables. |                                     | [SU4] test/exam - oral or written              |            |     |
| Subject contents                            | 1. Probability space.2. Conditional probability and independence of events.3. Random variable and its probability distribution and cumulative distribution function.4. Independence of random variables.5. Expected value and variance of a random variable.6. Limit theorems. |                                                          |                                                                                                                                                             |                                     |                                                |            |     |

|                                 |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
|---------------------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Prerequisites and co-requisites |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
| Assessment methods and criteria | Subject passing criteria                                       | Passing threshold                                                                                                                                                                                                                                                                                                                                                                                                                                            | Percentage of the final grade |
|                                 | tests                                                          | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.0%                         |
|                                 | exam                                                           | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 50.0%                         |
|                                 | observation of the student's attitude                          | 51.0%                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.0%                          |
| Recommended reading             | Basic literature                                               | 1. J. Jakubowski, R. Sztencel Wstęp do teorii prawdopodobieństwa, SCRIPT Warszawa 2001;2. Plucińska, E. Pluciński, Probabilistyka: Rachunek prawdopodobieństwa. Statystyka matematyczna. Procesy stochastyczne, Wydawnictwa Naukowo - Techniczne Warszawa 2000.3. W.. Krysicki i in. Rachunek prawdopodobieństwa i statystyka matematyczna w zadaniach4. J. Jakubowski, R. Sztencel, Rachunek prawdopodobieństwa dla (prawie) każdego, SCRIPT Warszawa 2006; |                               |
|                                 | Supplementary literature                                       | 1. G. Krzykowski, M. Szreder Rachunek prawdopodobieństwa i statystyka matematyczna2. M. Krzyśko, Wykłady z teorii prawdopodobieństwa, WNT Warszawa 2000;3. R. Bartoszyński, D. Niewiadomska-Bugaj Probability and Statistical Inference4. Freund, Miller, Miller John E. Friends Mathematical Statistics with Applications                                                                                                                                   |                               |
|                                 | eResources addresses                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |
|                                 | Example issues/<br>example questions/<br>tasks being completed | not included                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                               |
| Work placement                  | Not applicable                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                               |

Document generated electronically. Does not require a seal or signature.