GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

| | | | |
|---|---|---|---|
| Subject name and code | Financial Mathematics, PG_00067926 | | |
| Field of study | MATEMATYKA FINANSOWA | | |
| Date of commencement of studies | October 2025 | Academic year of realisation of subject | 2025/2026 |
| Education level | first-cycle studies | Subject group | Obligatory subject group in the field of study<br>Subject group related to scientific research in the field of study |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 1 | ECTS credits | 4.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Finance -> Faculty of Management and Economics -> Wydziały Politechniki Gdańskiej | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Ewa Mazurek-Krasodomska | |
| | Teachers | dr inż. Ewa Mazurek-Krasodomska<br>Jarosław Wróblewski | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 30.0 | 0.0 | 0.0 | 0.0 | 45 |

E-learning hours included: 0.0

eNauczanie source addresses:

Moodle ID: 47198 25/26 Matematyka finansowa
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=47198

**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 | 45 | 5.0 | 50.0 | 100 |

**Subject objectives**

Preparation of students to solve decision-making problems in finance using the tools of financial mathematics, based on knowledge of the time value of money and methods of valuing financial instruments, as well as the development of attitudes related to logical thinking and the precise formulation of solutions in the context of economic analyses.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K6_U04] develops logical solutions to complex or unstructured problems, even under conditions of uncertainty. | is able to perform calculations related to the valuation of financial instruments using appropriate mathematical models (interest, discounting, capitalization, annuity calculus) and analyze their impact on the future and present value of cash flows. | [SU2] Ocena umiejętności analizy informacji |
| [K6_W02] possesses advanced knowledge of methods and techniques that enable precise formulation and effective problem solving. | knows and understands the principles of the mathematical description of the time value of money, with particular emphasis on various interest rate models, discounting methods, and annuity calculus, in the context of analyzing financial and economic decisions | [SW1] Ocena wiedzy faktograficznej |

<table>
<tr><td>Subject contents</td><td>Course content – lecture<br>Time value of money - introduction.<br>Simple interest model (SIM), Capital Gains Tax.<br>Compound interest model (CIM) with annual, sub-period and continuous capitalization.<br>The calculation of the mathematical and commercial discount.<br>Valuation of short-term securities.<br>Real capital value, real interest rate.<br>Annuities - without capitalization, with capitalization, equal, compatible and non-compatible.<br>Valuation of long-term securities.<br>Construction of the loan repayment schedule, APRC calculation.<br><br>Course content – exercises<br>Simple interest model; capital gains tax<br>Compound interest model with annual, sub-annual, and continuous compounding<br>Mathematical and commercial discounting<br>Valuation of short-term securities<br>Real value of capital; real interest rate<br>Annuity calculations without compounding, with compounding, level, ordinary, and due annuities<br>Valuation of long-term securities<br>Construction of a loan repayment schedule; calculation of the APR (Annual Percentage Rate of Charge)</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Written exam with practical tasks</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Written test</td><td>60.0%</td><td>60.0%</td></tr>
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</td></tr>
<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Podgórska, M., Klimkowska, J. (2022). Matematyka finansowa. Warszawa: Wydawnictwo Naukowe PWN.<br>Redo, M., Prewysz-Kwinto, P. (2021). Matematyka finansowa. Warszawa: Wydawnictwo Naukowe PWN.</td></tr>
<tr><td>Supplementary literature</td><td>Borowski, J., Golański, R., Kasprzyk, K., Melon, L., Pogórska, M. (2003). Matematyka finansowa: przykłady, zadania, testy, rozwiązania. Wałbrzych: Szkoła Główna Handlowa.<br>Cegłowski, B., Podgórski, B. (2021). Finanse z arkuszem kalkulacyjnym. Warszawa: Wydawnictwo Naukowe PWN.<br>Sobczyk, M. (2011). Matematyka finansowa: podstawy teoretyczne, przykłady, zadania. Warszawa: Agencja Wydawnicza Placet.<br>Kellison, S. G. (2008). Theory of interest. New York: McGraw-Hill.<br>Piasecki, K., Ronka-Chmielowiec W. (2011). Matematyka finansowa. Warszawa: C.H. Beck.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>Calculation of the time value of money.<br>Calculation of the future value of investments.<br>APRC calculation.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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