# COURSE DESCRIPTION CARD

NOTE: If the course includes lectures and classes, the Course Description Card applies to both types of instruction.

| | |
|---|---|
| **1.** Course title:<br>in Polish / in English MEASUREMENT OF MARKET RISK | **2.** Course code:<br>Number of ECTS credits: 4,0<br>Course completion mode: E<br>Course commenced / Year 2019/2020 |

**3.** Major: Finance and Accounting

**4.** Department of major coordinator: Department of Banking and Financial Markets (dr hab. Grażyna Szustak, prof. UE)

**5.** Name of course instructor:
Lecture: dr Daniel Iskra
dr hab. inż. Krzysztof Targiel, Prof UE
**Examiner**: dr Daniel Iskra
dr hab. inż. Krzysztof Targiel, Prof UE

**6.** Department of course instructor: Department of Applied Mathematics / Department of Operations Research

**7.** Number of contact hours with students:

| Type of instruction | Full-time study | Part-time study |
|---|---|---|
| lectures | 30 | |
| classes | | |
| foreign language classes | | |
| lab classes | | |
| seminars | | |
| e-learning | | |
| other | | |
| **Total hours** | 30 | 0 |
| examination (hours) | 3 | |

**8.** Course timeframe - no. of semesters: 1

Course commencement / Year 1

Course commencement / Semester 2

| | |
|---|---|
| **9.** Level of tertiary education:<br>Master's Degree Programmes | **10.** Course status<br>□ Compulsory for the major …<br>X Compulsory for the specialization Quantitative Asset and Risk Management<br>□ Elective … |

**11.** Course prerequisites
Compulsory: Fundamentals of Mathematics & Statistics
Recommended: Time Series Analysis

**12.** Course objectives:
1. Presentation of the principles and methods of market risk measuring.
2. Developing analytical skills in modelling and measuring risk

**13.** Teaching and learning methods:

**A.** Direct student-instructor contact:

| No. | Teaching methods | Description | Number of hours | |
|---|---|---|---|---|
| | | | Full-time study | Part-time study |
| 1. | Computer lab classes | Integrated lecture | 15 | 0 |
| 2. | Active lecture using multimedia techniques | Integrated lecture | 15 | 0 |
| Total | | | AS: 30 | AN: 0 |

**B.** Self-study:

| No. | Learning methods | Description | Number of hours | |
|---|---|---|---|---|
| | | | Full-time study | Part-time study |
| 1. | Analysis of lecture notes | | 20 | 0 |
| 2. | Solving case studies | | 20 | 0 |
| 3. | Independent work using a computer | | 20 | 0 |
| 4. | Analysis of source materials | Analysis of the Basel Committee's recommendations | 10 | 0 |
| Total | | | BS: 70 | BN: 0 |

Total AS+BS = 100
Examination (E) = 3
Total AS+BS+E= 103

Total AN+BN = 0
Examination (E) = 0
Total AN+BN+E = 0

**14.** Key words: risk measurement, market risk

**15.** Course content:

1. Introduction to risk management (risk classification in bank activity, risk management organization, international Basel Committee's recommendations in risk measurement, standard method)
2. Introduction to risk factors (interest rate risk, securities exchange rate, foreign currency exchange rate, commodities exchange rate)
3. Modelling and estimation of parameters of risk factors changes distribution (approach based on moving average, ARIMA models)
4. Accuracy improving methods of distribution parameters estimation (models: EWMA, ARCH, GARCH)
5. Models of interest rate changes based on stochastic differential equations
6. Value at Risk (historical simulations, variance-covariance method, Monte Carlo simulations)
7. Value at Risk – Back-testing
8. Delta and Delta-Gamma approaches

**16.** Course learning outcomes as related to the learning outcomes of the major and methods for assessing student attainment

| Intended learning outcomes of the major / Symbols | Intended learning outcomes of the course | Methods for assessing student learning outcomes | Documentation |
|---|---|---|---|
| | Knowledge | | |
| FiR2_W01# | Student has detailed knowledge about: financial activity in international environment and market risk connected with it; possibilities of risk management and risk measurement supported by maths methods. | Written exam | Students' exam papers |
| FiR2_W02# | Student has detailed knowledge about: tools and methods allowing to describe professionally and measure risk connected with changes of market factors | Written exam | Students' exam papers |
| | Skills | | |
| FiR2_U01# | Student has the skills to use theoretical knowledge (for professional description and analysis of market risk) broadened by formulating their own opinions based on the market risk measurement. | Written exam | Students' exam papers |
| FiR2_U04# | Student has the language skills and set of vocabulary from market risk measurement | Written exam | Students' exam papers |
| | Social competences | | |
| FiR2_K01# | Student understands the need to complete the knowledge from market risk measurement based on international standards | Written exam | Students' exam papers |
| FiR2_K02# | Student can critically complete the knowledge and skills from market risk measurement taking into account the integrity with international risk management standards | Written exam | Students' exam papers |

**17.** Method for determining the final course grade:

| No. | Methods for awarding credits and course completion requirements | Description | Percentage of the final course grade* |
|---|---|---|---|
| 1. | Written exam (without possibility to use course books) | Exam involving solving tasks in the field of the subject | 100% |

* If students are required to obtain both a class grade and an exam grade, the class grade constitutes at least 30% of the final course grade.

**18.** Reading list

Mandatory readings:


1. Revisions to the Basel II market risk framework, updated as of 31 December 2010. Basel Committee on Banking Supervision, Basel, 2011.
2. Alexander, C.: Value-at-Risk Models. Wyd. John Wiley & Sons, 2008.
3. International Convergence of Capital Measurement and Capital Standards. A Revised Framework Comprehensive Version, Basel Committee on Banking Supervision, Basel, 2006.

4. Jorion, P: Value at Risk, 3rd ed., McGraw-Hill, 2006.
5. Penza P., Bansal V.K. : Measuring Market Risk with Value at Risk. John Wiley & Sons, New York, 2001.

Suggested readings:

**19.** Language of instruction: English

**20.** Course instructors' recommendations:

computer lab room with board
Ms Office
R program