COURSE DESCRIPTION CARD

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

1. Course title:
EXCEL & VBA FOR QUANTITATIVE FINANCE

2. Course code:
Number of ECTS credits: **4**
Course completion mode: **Z**
Course commenced / Year **2022/23**

3. Major: **Finance and Accounting for Business**

4. Department of major coordinator: **Department of Banking and Financial Markets**

5. Name of course instructor:
Lecture **dr Rafał Buła**
Classes:-
Lab classes **dr Jan Kaczmarzyk**
Examiner dr Jan Kaczmarzyk, dr Rafał Buła

6. Department of course instructor: **Department of Public Finance & Department of Investment**

7. Number of contact hours with students:

Type of instruction	Full-time study	Part-time study
lectures	**15**	**12**
classes	-	-
foreign language classes	-	-
lab classes	**30**	**21**
seminars	-	-
e-learning	-	-
other	-	-
Total hours	**45**	**33**
examination (hours)	-	-

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

Course commencement / Year **3**

Course commencement / Semester **6**

9. Level of tertiary education: **Bachelor**

10. Course status
☒ **Compulsory for the major Finance and Accounting for Business**
☐ Compulsory for the specialization …
☐ Elective

11. Course prerequisites
Compulsory:-
Recommended:-

12. Course objectives:

1. **Presenting the Excel & VBA environment as a comprehensive and professional platform which enables financial instruments portfolio optimization and risk analyses conducting.**
2. **Teaching the ability to construct tools for financial instruments portfolio optimization and risk analyses using the Excel & VBA environment.**

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.**	**Constructing tools enabling risk analyses.**	**30**	**21**
2.	**Active lecture**	**Presenting algorithms enabling financial instruments portfolio optimization.**	**15**	**12**
Total			AS: **45**	AN: **33**

B. Self-study:

No.	Learning methods	Description	Number of hours	
			Full-time study	Part-time study
1.	**Individual work using a computer.**	**Becoming adept at constructing tools for portfolio optimization and risk analyses.**	**35**	**37**
2.	**Analysis of lecture and lab notes.**	**Becoming familiar with the rules and methods of constructing tools for portfolio optimization and risk analyses.**	**10**	**15**
3.	**Cause & effect self-study using literature.**	**Deepening knowledge regarding the rules and methods of constructing tools for portfolio optimization and risk analyses.**	**10**	**15**
Total			BS: **55**	BN: **67**

Total AS+BS = **100**
Examination (E) = **0**
Total AS+BS+E= **100**

Total AN+BN = **100**
Examination (E) = **0**
Total AN+BN+E = **100**

14. Key words: **risk analysis, MS Excel, portfolio theory, VBA**

15. Course content:

Lectures module (dr Rafał Buła, Department of Investment)
Financial instruments portfolio optimization using Excel & VBA

1. Finding financial instruments parameters for constructing financial instruments portfolio.
2. Earnings horizon according to the Ibbotson-Sinquefeld method.
3. Financial instruments portfolio and its efficient frontier.
4. Efficient financial instruments portfolio
   (two and more elements portfolio, risk free instruments)
5. Portfolio management quality assessment
   (calculation of measures like Sharpe ratio, Treynor ratio, Jensen alpha, Sortino ratio, MM, Omega)

Laboratories module (dr Jan Kaczmarzyk, Department of Public Finance)
Risk analysis Excel & VBA

1. Market risk analysis:
   a. importing, merging and filtering of financial markets data,
   b. simple and logarithmic rates of return, future value scenarios and their randomness,
   c. measurement of volatility, threat and sensitivity using rates of return and future value scenarios,
   d. graphical presentation of volatility and threat using frequency functions, cumulative distribution functions and probability density functions,
   e. rates of return, their randomness and market risk forecasting in longer time horizon (geometric Brownian motion, Monte Carlo simulation and Bootstrap simulation),
2. Entrepreneurial risk analysis:
   a. financial models for entrepreneurial risk analysis,
   b. traditional methods of entrepreneurial risk analysis,
   c. Monte Carlo basics for entrepreneurial risk analysis.

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		
FAB1_W01#	The student knows and understands at an advanced level financial risk and its impact on the activity of economic entities as well as methods enabling financial risk analysis and diversification.	Solving tasks using a computer	Student work
	Skills		
FAB1_U01#	The student is able to use knowledge in the field of finance and accounting to solve the problems in terms of financial instruments portfolio optimization and risk analyses conducting through the appropriate selection of information sources and tools available in the Excel & VBA environment.	Solving tasks using a computer	Student work
FAB1_U04#	The student demonstrates the language skills on the B2 level while optimizing financial instruments portfolios and conducting risk analyses.	Solving tasks using a computer	Student work
	Social competences		
FAB1_K01#	The student is ready for critical assessment/evaluation of the obtained information and knowledge in the field of financial instruments portfolio optimization and risk analyses conducting.	Solving tasks using a computer	Student work

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.	Using a computer without books and other materials	Solving tasks regarding portfolio optimization and risk analyses using a computer (lectures/laboratories).	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. Pera K., Buła R., Mitrenga D.: Modele inwestycyjne. Wyd. C.H. Beck, Warszawa, 2014.
2. Kaczmarzyk J. (2018), Forecasting currency risk in an enterprise using the Monte Carlo simulation, Nauki o Finansach Nr 4 (23), s. 50-62.
3. Kaczmarzyk J. (2016), Prospective financial analysis with regard to enterprise risk exposure - the advantages of the Monte Carlo method, Nauki o Finansach, Nr 2 (27), s. 23-37.

Suggested readings:

1. Edwin J. Elton, Martin J. Gruber, Stephen J. Brown, William N. Goetzmann: Modern Portfolio Theory and Investment Analysis. Wyd. Wiley, Hoboken, 2010.
2. Jackson M., Staunton M.: Advanced modelling in finance using EXCEL and VBA. Wyd. John Wiley & Sons, Chichester, 2007.

19. Language of instruction:
English

20. Course instructors' recommendations:

Required computer lab with Microsoft Excel 2016 (desktop version)