**Table 5.2** Course specification

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| **Study programme:** Advanced Data Analytics in Business | | | | |
| **Course name: Optimization and Business Decision-Making** | | | | |
| **Lecturers:** Jelena J. Stanković, Jason Papathanasiou | | | | |
| **Course status:**Core subject | | | | |
| **Numberof ECTS credits:** **8** | | | | |
| **Precondition:**None | | | | |
| **Aims of the course**  Students will acquire knowledge related to operation research and decision theories methods used in business and economics. Based on the mastered approaches and concepts of decision-making, students will be able to conduct independent and autonomous empirical research in this area. | | | | |
| **Learning outcomes**  Students will be able to:   * apply linear programming modelling in the field of business management; * apply multi-criteria analysis methods in the field of finance; * conduct independent research and solve case-study problems through practical examples and the use of Python as an appropriate programming language. | | | | |
| **Content of the course**  *Theoretical lectures*  *Linear programming optimization*: Course starts with the concept and formulation of linear programming, followed by optimization methods and sensitivity analysis. During the course, some linear programming examples are explored, starting with some very basic mathematical theory behind the simplex method and moving on to some real-world examples. During the course we’ll be using Python and a linear programming optimization packages PuLP and Pyomo.  *Multi-criteria analysis*: The course studies the basic concepts of multicriteria analysis, model formulation and three methods for solving this type of problem - AHP, TOPSIS and VIKOR. During the classes, practical examples will be solved using the Python programming language.  *Practical course work*  Application of optimization and business decision-making methods and models on empirical data by employing the programming language Python in order to provide practical knowledge that will enable students to solve real-case problems and obtain adequate conclusions. | | | | |
| **Literature**   1. Barry Render, Ralph M. Stair Jr., Michael E. Hanna, Trevor S. Hale (2017)Quantitative Analysis for Management, Global Edition, Pearson, ISBN-13: 978-1292217659 (Chapter 7 and Chapter 8) 2. Jason Papathanasiou, Nikolaos Ploskas (2018) Multiple Criteria DecisionAid - Methods, Examples andPython Implementations, Series Springer Optimization and Its Applications, ISBN 978-3-319-91646-0, Springer International Publishing (Chapter 1, Chapter 2 and Chapter 5) 3. Hart, W.E., Laird, C.D., Watson, J.-P., Woodruff, D.L., Hackebeil, G.A., Nicholson, B.L., Siirola, J.D. (2017) Pyomo — Optimization Modeling in Python, Series Springer Optimization and Its Applications, Springer International Publishing (Part I An Introduction to Pyomo) | | | | |
| **Number of active teaching classes** | **Lecturing:**45 | | **Practical course work:** 30 | |
| **Learning activities methods**  Presentation, dialogue, graphics, programming language demonstration, indvidual work. | | | | |
| **Knowledge assessment (maximum100 points)** | | | | |
| **Pre-exam activities** | Points | **Exam results** | | Points |
| Participation in lecturing classes | 10 | Written exam | | 40 |
| Participation in practical course work | 10 | Oral exam | | 0 |
| Colloquium | 20 | Project presentation | | 10 |
| Paper work-case study | 10 | **Total** | | **100** |