**Table 5.1** Course specification to doctoral study programs

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| **Course name: Selected chapters in applied mathematics** | | |
| **Teacher or teachers:** | | |
| **Course status:** Elective | | |
| **Number of ECTS:** 10 | | |
| **Precondition courses:** None | | |
| **Educational goal**  The goal of the activity of students within this subject reflects in acquiring the necessary experience through solving the complex problems and tasks from the applied mathematics, and recognition of potential for application of acquired knowledge in solving the hydrological problems in practice. | | |
| **Educational outcomes**  Students acquire competences to solve hydrological problems using the methods of applied mathematics and software packages MATLAB and MATHEMATICA. | | |
| **Course content** Matrix Algebra. Characterizing and Displaying Multivariate Data. Multivariate Normal Distribution. Multivariate Analysis of Variance (MANOVA). Spectral theory. Canonical Correlation Analysis. Principal Component Analysis. Factor Analysis. Cluster Analysis. Stochastic Processes. Markov Chain. | | |
| **Literature**  1. Rencher, C. A., Methods of Multivariate Analysis, 2nd ed., John Wiley & Sons, Inc., 2002.  2. Jolliffe,I.T., Principal Component Analysis, 2nd ed., Springer, 2002. 3. Bremaud, P.,Markov Chains: Gibbs Fields, Monte Carlo Simulation, and Queues, Springer, 1999. | | |
| **Number of active teaching classes (weekly)** | Lectures: 4 | Study research work: 0 |
| **Teaching methods**  Lectures. Consultations and interactive work with the students. Lectures are organized in combined form. The presentation of the theoretical part is followed by the corresponding examples. | | |
| **Knowledge evaluation (maximum 100 points)**  **Pre-examination obligations Points Final exam Points**  Lecture attendance **10**  Oral part of the exam **30**  Colloquium exam **30**  Term paper **30** | | |