

State Final Examinations	Academic Year: 2018/2019
Master's Degree Studies Program:	Engineering Informatics
Study Branch:	Information Technologies

## **Multimedia and Information Systems**

### **Compulsory Elective Subject**

1. Steganography - digital watermarking technology and their application in multimedia.
2. Sampling and quantization of various kinds of multimedia signals.
3. Methods for multimedia files storage. Principles and algorithms of lossy compression as JPEG, MP3, MPEG and others.
4. Methods of sound storage - samples, MIDI, parameters for audio storage, overview of audio formats.
5. Overview of formats for multimedia data storage to CD, DVD and Blu-ray disc. Main differences between the particular types of discs.
6. Methods of video storage in a computer, an overview of the most frequently used containers and codecs. Parameters influencing the video quality and file size. Advantages of non-linear video editing, principles of post-processing programs. Formats of movie subtitles.
7. A brief introduction to HTML5, HTML5 API. DHTML: Document Object Model (DOM), dynamic events, types and event handling. Usage of JavaScript for client event handling.
8. HTTP protocol principle, request types, differences between GET and POST method, the structure of headers, authentication/authorization support.
9. Methods of context maintaining ("sessions") in web applications. Client browser data storage options using HTML5 API (localStorage, sessionStorage).
10. Web services (WEB API): definition, principle, architecture, possible use and most common data exchange formats. A brief description of REST and SOAP.
11. Basic principles of cartography and its role for GIS, map projections: according to cartographic distortion, by the shape of the display area, according to the position display area axis. The utilization of map projections for data presentation in GIS.
12. Global Positioning System: a space segment, command and control segment, user segment, the basic principles of positioning and timing.
13. Basic features of GIS. Comparison with other types of information systems. The intended use of GIS and typical application areas. Geographic objects and their basic types.
14. The process of obtaining and storing geographic data. Data models and their comparison. Ways of geographic data presenting and GIS analysis results.
15. Raster and vector representations of geographic data. Their variants, possibilities, advantages and disadvantages.
16. Methods of the geographic data analysis. The analysis based on the topological information. Distance analysis in GIS. Weighted distance and its utilization.
17. Definition of simulation, areas of use, the methods of analysis of the discrete event systems (software for computer simulation - Witness).
18. Random variables, use of random variables for simulation of discrete event systems and production systems. Random number generation with a given random distribution. (Monte Carlo method).

19. Simulation of continuous systems. Numerical methods for solving the ordinary differential equations.
20. Simulation of discrete event systems (basic terms, steps of the simulation process, statistical characteristics of a system, calendar of events).