State Final Examinations	Academic Year: 2021/2022
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 storage formats of multimedia data on CD, DVD and Blu-ray. Main differences between disc types. Cloud storage solutions and multimedia sharing.

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 properties of GIS. Purpose of using GIS and typical application area. Geographical objects and their basic types. Methods of obtaining and storing geographic data. Data models and their comparison. Ways of presentation of geographical analyzes in GIS.

12. Coordinate systems and map projections applied in GIS, World Geodetic System 1984, Unified trigonometric network system of cadastral S-JTSK, Krovak East North, types of cadastral map (DKM, KDM).

13. Sources of GIS data and services: National Geoportal, Czech Office for Surveying, Mapping and Cadastre, other sources of data and services (RMD, CEDA, Openstreetmap, Copernicus). INSPIRE directive (Open Infrastructure Consortium).

14. Raster and vector representation of geographical data. Its variants, possibilities, advantages and disadvantages. Raster tile, vector tile.

15. Methods of geographical data analysis. Analysis based on topological information. Distance analysis in GIS. Weighted distance and its utilization.

16. Global satellite positioning systems: space segment, control and control segment, user segment, basic principles of positioning and time. GPS, GLONASS, Galileo: current status of their implementation.

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).