

State Final Examinations	Academic Year: 2020/2021
Master's Degree Studies Program:	Engineering Informatics
Study Branch:	Security Technologies, Systems and Management
Study Focus:	Technical, Management

## **Security Systems Technical Resources**

### **Compulsory Subject**

1. Intruder and Hold-up Systems, (I&HAS) – Their determination, block diagrams, bus-connected devices, programming methods, basic system modes, communication methods with alarm receiving centres.
2. Intruder and Hold-up Alarm Systems Security Levels – The advanced functions of motion detectors - (PIR, dual detectors, laser detectors, video detection).
3. Fire Detection and Alarm Systems, (FS) – Their determination, block diagrams, insulator activity principles, modes of operation (DAY, NIGHT), fire brigade key safes, fire brigade service facilities – their determination, operation principles, fire detectors - types, operation principles.
4. Building security in terms of fire safety - production and non-production buildings. Fixed fire extinguishing equipment. Heat and smoke removal equipment. EPS links to security systems.
5. Access Control Systems, (EACES) – Their determination, block diagrams, the contents of database system tables and their operation principles, other applications of access systems, identification of biometric features and their capture.
6. Access systems, their structure and communication interfaces, connection of detectors and cameras, panel programming, time zones and authorizations.
7. Subject identification methods, identification classes, contact and contactless cards (RFID), principle of operation, advantages and disadvantages, cards with wiegand effect, advantages and disadvantages. Principle of transfer between card and reader. One-way and two-way authentication for RFID cards.
8. Biometric Identification Methods used in Practice, (e.g. Fingerprints, Facial Recognition) - Principles of functions and properties, advantages and disadvantages of biometric readers.
9. CCTV Systems Legislative Requirements – The operation of camera systems from the perspective of Act No. 110/2019 Coll., On the Protection of Personal Data.
10. Basic Image Capture - Digitisation, colour models, image compression and video compression principles, additional camera functions: Electronic Shutter Function - BLC, PWI, GAMA, White Balance, Video Sync.
11. Analogue and Digital Camera Design - Basic camera elements: lens and their parameters, apertures and their functions, CCD, CMOS and DPS sensors; Camera accessories: covers and holders, positioning heads, dome cameras, remote control, infrared illumination.
12. Closed Circuit Televisions, (CCTV) - structures, camera switches, image dividers, multiplexers, cross-fields, video detectors; video transmission - metallic lead, fibre-optic transmission, wireless data transfer.
13. Camera System Imaging Units - Basic projector parameters, CRT, LCD and DLP projectors; Image Recording: VCR analogue recording, slow-motion video recorders; digital DVR recording, recording media for digital video recording.

14. Technical Aids for Performing Link and Radio Tapping - Operation principles, technical aids for the detection of tapping.
15. Electromagnetic Compatibility Principles - The division of EMC, legal and technical requirements, a classification of interference signals, electromagnetic radiation - (interference).
16. Electromagnetic Susceptibility - Definition, reasons and criteria for classification, interference reduction techniques.
17. Electromagnetic Emissions of Intruder and Hold-up Alarm Systems Measurement - A general measurement schematic, classification, requirements and measurement procedures, measurement devices and environment.
18. Optical Fibres - Physical transfer principles, key long-distance transmission parameters, optical fibre types, signal apertures, numerical apertures.
19. Signal Concept Definition - Basic criteria for signal-sorting and examples of signals from individual groups; Signal Modulation, Principles, Variants, Applications and Application Areas.
20. Field-bus Characteristics - Typical parameters and their comparison with similar parameters of laboratory buses, CAN bus characteristics and application areas.