

State Final Examinations	Academic Year: 2020/2021
Master's Degree Studies Program:	Engineering Informatics
Study Branch:	Integrated Systems in Buildings

## Control of Integrated Systems

1. **Intelligent Buildings Requirements** – Intelligent building components, environments, intelligent building systems specifications and requirements, systems architecture, home networks, communication gates, relation to fire protection and security systems.
2. **Basic Knowledge of Communication Technology** – Field bus communication, communication network, digital data transfer systems, the ISO/OSI Model, basic topology, access methods.
3. **HVAC Technology in Buildings** – HVAC systems, heating systems, AC systems, fire-fighting and security systems, access systems, camera systems.
4. **Control Systems in Buildings** – Communication topology, BUS field-bus systems (M-bus, Profi-bus, KNX, LONWorks).
5. **Control Systems Technical Resources** – Sensors, transducers, intelligent sensors, (PLC) stations.
6. **Data Transfer** – Kinds of modulation, demodulations, data-networks, Ethernet and Internet, gates, data security.
7. **Data Transfer Media** – Twisted pair, coaxial cable, optical cable, power cable, RF wireless network.
8. **PLC** – Hardware description, programming means and resources, real-time technology process control possibilities.
9. **PLC Instruction Base** – Division, instructions, macro-instructions, program structures, directives, PLC data and operands, additors function principles.
10. **Field Bus Systems** – Topology, field-bus connectors, line connectors, sensors and actors, medias of communications.
11. **KNX Field Bus Systems 1** — Bases of communications, structure and topology, basic data transfer parameters, communication interfaces, bits architecture, addresses, standardized data parameters, collision protection.
12. **KNX Field Bus Systems 2** — Telegrams, telegram structure and composition, priorities, telegram back messages, required telegram transmission time, telegram delivery protection.
13. **KNX Field Bus Systems 3** — Communication means and parameters (STP, PL, RF, IR).
14. **KNX Field Bus Systems 4** — Design –ETS 4 software and its basic parameters, basic design procedures, physical and group addresses, database equipment (sensors and actors).
15. **LONWorks Field Bus Systems** — Applications, basic parameters, communication points (nots), bits transfer, interfaces, addresses, field bus access, system codes, collision avoidance, LNS and WEB servers, communication software.
16. **BACnet** – Conceptions (aim), transfer means, communication layers, BACnet equipment and applications.
17. **SCADA** – Viewing technology systems, data transfer, TCP/IP protocols, interfaces and gates, Control Web.
18. **Building Management** – Building management systems content and structure applied to HVAC systems operations, (CMMS) computer support, energy management basic elements, building management content and structure.

19. **HVAC Engineering Quantities Measurement 1** – Basic statistical evaluation, measurement principles and equipment for basic field quantities (temperature, flow of liquid, velocity, liquid flow, air humidity, acoustical parameters, lighting parameters, building material and structure thermo-physical parameters).
20. **HVAC Engineering Quantities Measurement 2** – Heat pump and solar collector efficiency, air diffuser parameters.