Issues for the diploma examination - Mechatronics 1st degree

- 1. Hardware and software components of computer networks.
- 2. Routing in computer networks.
- 3. The seven-layer OSI / ISO model.
- 4. Structures of computer networks.
- 5. File, application and print server functions in a computer network.
- 6. Wireless computer networks (Wi-Fi, WLAN).
- 7. Inheritance in object-oriented programming.
- 8. The concept of an artificial neural network. Selected models of an artificial neuron.
- 9. Methods of training artificial neural networks.
- 10. Types of passive and active elements in electronics.
- 11. Features of an ideal operational amplifier.
- 12. The concept of active and reactive power.
- 13. Negative feedback.
- 14. Functional diagram of a typical automatic control system with a feedback loop.
- 15. Basic elements of an automatic control system.
- 16. Operation principle of a programmable logic controller (PLC).
- 17. Manipulator workspace.
- 18. Sensory systems used in robotics.
- 19. Navigation systems of mobile robots (wheel drive, caterpillar drive).
- 20. Advantages and disadvantages of walking mechanisms.
- 21. Materials used in the construction of machines and devices.
- 22. Basic differences between steel and cast iron.
- 23. Types of carbon steel.
- 24. Basic machining processes in the production of machine parts.
- 25. Types of connections of parts in machine building.
- 26. Bearings application, components.
- 27. Types of transmissions used in machine building
- 28. Basic types / components of technical documentation.
- 29. Types of lubricants.
- 30. Methods of manufacturing plastic parts.
- 31. Examples of mechanical drives.
- 32. Wear process of machine parts.
- 33. Reliability of machinery and technical devices.
- 34. Purpose and content of operation and maintenance documentation.
- 35. Aims of building a prototype of a machine or device.
- 36. Basic types of composite materials.
- 37. Heat treatment of metals.
- 38. Protective coatings for machine parts.
- 39. The role (importance) of engineering fits in machine elements.
- 40. Definition of friction. Parameters describing friction. The role of friction in various constructions of technical devices.

Area issues - Computer Engineering and Mechatronics

- 1. Transmission media in LAN networks.
- 2. Properties of a real-time operating system.
- 3. Properties of a microcontroller.
- 4. Classic genetic algorithm.
- 5. Definition of RMS voltage.
- 6. Differences between welding, soldering and welding.
- 7. Gear transmissions.
- 8. Pneumatic and hydraulic drives.
- 9. Building a user interface for an Android mobile application visual interface elements, views, etc.
- 10. Construction of a servomechanism. Application examples.
- 11. Application of artificial intelligence in robotics.
- 12. Application of renewable energy resources in robotics.
- 13. Definitions of terms: photovoltaic cell, photovoltaic module, matrix of photovoltaic modules.
- 14. Construction and operation of a photovoltaic module. Types and characteristics of basic electrical parameters of a photovoltaic module.
- 15. Energy harvesting.
- 16. Characteristics of HTTP protocol.
- 17. Relational database model.
- 18. The concept of Context, Activity, Intent and Service in Android.
- 19. The use of open hardware platforms such as Arduino or Raspberry Pi. Advantages and disadvantages of their use.
- 20. Differences between a class and an object.