# SUBJECTS TAUGHT AT THE DEPARTMENT

**Bachelor`s degree**

| № | Name of the subject | Brief information about the subject |
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| 1 | Introduction to Specialty | Conditions and perspectives of development of water industry automation in Uzbekistan. History of the development of irrigation in Uzbekistan. Hydromeliorative systems as objects of automation and management. Place and role of a specialist on automation and management in Hydromelioration. |
| 2 | Electronics and Microprocessor Technology | Theoretical matters of the use of electronic instruments, photoelements, semi-conductors, diodes, transistors, stabilizers, filters, intensifiers, matrix systems, analogical and digital integral microschemes, integral operational intensifiers, microprocessor-based functional elements, static and dynamic current intensifiers etc. |
| 3 | Technical Means of Automation | Automation technical means classification, static and dynamic characteristics of automation elements, role of technical means in a general scheme of automation, technical means of information systems, automated generators, functional and logical elements, command installation, comparing organs, special discrete elements, executive mechanisms, etc. |
| 4 | Devices and Means of Technical Control | Technological control installations and their classification, automated structure of technical control, automation signals, automated information- gathering, technological controller, measure-default and concreteness class. Structure and main elements of technical devices` management. |
| 5 | Theory of Automation Control | Managing tasks content, system control classification, models and characteristics of automated control system, analysis of the automated control system, stability, manageability, observability, invariantness, sensitivity, root, frequent and integral qualities, controlling system synthesis, models of discrete signals and systems, non-linear models, etc. |
| 6 | Identification Principles of Controlling Objects | Identification criteria, model classification, static and dynamic models, fixed and perfume models<br>Technological process and modeling method of target model and calculation method of modern management system. Modeling and analysis of control systems, synthesis of constant analysis and case studies, modeling and analysis methods. (Matlab, Matcad, Siam, SS) |
| 7 | Reliability of control systems and automation systems | Modern methods of assessing the reliability and diagnostics of control systems and automation systems, technical processes and object reliability |

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| 8 | Designing of Automated Systems | General issues of design and basic normative documents of design. Design of automated systems, coordination of technical equipment, normative documents, project structure and contents, structure of technical process, functional technology and major plans, object management study, controller selection, control device and automation. Select primary measurement transducers, select playback mechanism and select controls. Design of electrical systems for automated systems. |
| 9 | Systems of Design Automation | Modeling of design processes. Schema development. Architecture of Automated Architectural Design Systems. The data model. Automated Design Process Implementation Methodology. Tools and methods for Automation systems development. Mechanical graphics. Interactive graphics system. Creating an effective database. Engineering method of automatic design process. AutoCAD, AutoCAD (Compass): General information; Coordinate system; Simple (primitive) properties; Display screen; Construction of objects; An instruction to create a shape; Edit the plan; Spaceships and paintings; Forming a three-dimensional object; Editing in 3D space; Visualization of 3D model; Application operations. |
| 10 | Automation of Technical Processes of Hydromeliorative Systems | Drainage system, pumping stations, hydroelectric power plant, automation technology water pump station, to make a welfare state; automation of management, automation technology to assess the dynamic characteristics of complex and mutual drainage systems, automation, standard technology processes and practical knowledge of problems, systematic approach to local problems and problems related to water production facilities as objects of control facilities and drainage systems, integrated automation management system |
| 11 | Maintenance, Adjusting and Use Exploiting of Automatic Systems | A description of the production and technical characteristics of automated objects, automation of technical processes; the role and importance of automated control systems; control devices and automatic maintenance; automated means and devices; detecting categories of control measuring devices and automation devices; relative performance factor; content detection of control weighing and automation services; performing repair work; determination of the number and qualification of the tools to inspect and conduct the tools; maintenance team; occupational safety and technical safety at technical service branches; starting, adjusting and assembling work; assembly work schedule |
| 12 | Automated Systems Management of Technical Processes in Water Economy | Technical management targets for hydromeliorative systems (HMS); automatic management system and cybernetics; HMS management problems and systematic approach; local and complex automation; automation problems related to HMS; functions and structure of automated systems; management systems; microprocessor technology; Functional structure of mathematical support; PC connection device; Modem connection to the object; ACS information technology; CS organization procedures and steps; Channel planning and organization – Technical automated structure for pool management; Channel tuning algorithm; Economic efficiency of ACS. |