THE REPUBLIC OF UZBEKISTAN

MINISTRY OF HIGHER AND SECONDARY SPECIALIZED EDUCATION

ANDIJAN MACHINE - BUILDING INSTITUTE

To get the list is:

№ 702

2022-y «24»

08

"CONFIRMED"

Vice-rector for educational work

a.t.p. _____ S.R.Aliyev

24 08 2022-y

# « COMPUTING MACHINES, SYSTEMS AND NETWORKS»

SCIENCE

WORKING TRAINING PROGRAM

education: 310000 – Engineering work

the direction of Education: education: 5312600- Mechatronics and robotics

| | | |
|---|---|---|
| **General training hour** | **184 hour** | **7-semester** |
| **Lecture** | 48 hour | 48 hour |
| **Practical training** | 36 hour | 36 hour |
| **Laboratory classes** | 12 hour | 12 hour |
| **Independent training hour** | 88 hour | 88 hour |

**Andijan – 2022**

The working curriculum of the subject was prepared on the basis of the program of the subject "Computing machines, systems and networks" approved by the order of the Ministry of Higher and Secondary Special Education of the Republic of Uzbekistan dated "___" _____ of 2022.

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## I. Relevance of educational science and its role in higher professional education

The science of computing machines, systems and networks is designed for students of the educational direction 5312600 - "Mechatronics and robotics", as well as related undergraduate education directions, which includes such issues as computing machines, systems and networks used in production processes at industrial enterprises, their classification, structure, methods of construction, the trend of the history and development of Science, the

Over the next years, Mechatronics is widely developed all over the world, with a new network of Science and technology. Mechatronics is a science based on knowledge in the field of mechanics, electronics and electrical engineering, as well as the achievements of modern computer technology. Computer systems are the fundamental basis of modern machines and units with new quality indicators.

## II. Purpose and function of educational science

**Purpose of teaching science -** teaching students the principles of operation of modern computer systems and networks. Formation of skills in working with the architecture of computer systems, network topologies and protocols.

**The function of science –** in order to achieve this goal, the science performs students the tasks of theoretical knowledge, practical skills, a methodological approach to the control devices of computer systems, as well as the formation of a scientific worldview.

**Methodological guidelines for teaching educational science.**

student during the study of the discipline “ Computing machines, systems and networks ":

- Introducing students to the architecture of computer systems;
- Familiarization of students with the sturcture of computer networks;
- Teaching students modern methods of information exchange;
- Teaching students methods of network management;
- Teaching students how to control computer systems using controllers;
- Teaching students creative thinking in the construction of control systems.

## III. Main theoretical part (lecture sessions)

In the main part, the topics of science are brought in a logical sequence. The essence of each topic is revealed through basic concepts and theses. This should fully cover the knowledge and skills required to be delivered on the basis of DTS to students on the subject.

It is recommended that the demand for the quality of the main part covers the relevance of the topics, their compliance with the requirements of employers and production needs, socio-political and democratic changes taking place in our country, the priority issues of reforms in the liberalization of the economy, economic and legal and other spheres, and that the latest achievements of Science and

**Lecture sessions**

1- table

| T/R | Lecture sessions | Hour |
|---|---|---|
| | **7-semester** | |
| **1** | **Architecture of computing machines and systems** | **12** |
| 1.1 | History and development trends in computer systems science. | 2 |
| 1.2 | Architecture of computing systems. | 2 |
| 1.3 | External devices and functional characteristics. | 2 |
| 1.4 | Memory devices. | 2 |
| 1.5 | Information and computing systems. | 2 |
| 1.6 | Assessment of the productivity of computing systems. | 2 |
| **2** | **Information transfer fans** | **4** |
| 2.1 | Wired information transmission fans. | 2 |
| 2.2 | Wireless information transmission fans. | 2 |
| **3** | **Fundamentals of network construction.** | **12** |
| 3.1 | The main types of computer networks. | 2 |
| 3.2 | Local computing network topology. | 2 |
| 3.3 | Standard network protocols. ISO / OSI model. | 2 |
| 3.4 | Methods for managing information exchange. | 2 |
| 3.5 | Network software. | 2 |
| 3.6 | Architecture of network operating systems. | 2 |
| **4** | **Computer networks.** | **14** |
| 4.1 | Local networks. | 2 |
| 4.2 | Ethernet networks. | 2 |
| 4.3 | Network devices. | 2 |
| 4.4 | Functions of network devices. | 2 |
| 4.5 | Network equipment. | 2 |
| 4.6 | Global network. | 2 |
| 4.7 | MPLS technology. | 2 |

| | | |
|---|---|---|
| **5** | **Network protocols.** | **6** |
| 5.1 | TCP / IP protocols steki. | 2 |
| 5.2 | TCP and FTP transport step protocols. | 2 |
| 5.3 | Network services. | 2 |
| **Total** | | **48** |

Lecture classes are held for the flow of academic groups in an audience equipped with multimedia structures.

## IV. Instructions and recommendations for practical classes

Practical classes create practical skills and experience in the design of a technological process operation, which is a component of engineering decision-making in students, knowing its structural elements, making appropriate calculations, solving examples and issues:

**Practical training**

2- table

| N | Topics of practical classes | Hour |
|---|---|---|
| **7-semester** | | |
| 1 | The main blocks of the computer are their functions and pointers. | 2 |
| 2 | Possibilities of connecting with other types of computing systems. | 2 |
| 3 | Multi-machine and multi-processor computing systems. | 2 |
| 4 | Peak and real productivity. MIPS and Flops units. | 2 |
| 5 | Twisted pair-based cables. Coaxial cables. Fiberglass cables. | 2 |
| 6 | Wireless communication channels. Adaptation of technological pointers of communication paths. | 2 |
| 7 | Tire, Star and Ring topologies. | 2 |
| 8 | Multi-machine and multi-processor computing systems. | 2 |
| 9 | Function of operating systems. Network operating systems. | 2 |
| 10 | Features of the local network. Local network in a detachable fan. | 2 |
| 11 | Fast working versions of the Ethernet network. | 2 |
| 12 | Token-Ring network. | 2 |
| 13 | Primary networks. Frame-Relay technology. | 2 |
| 14 | IP global Networks. Remote possession. | 2 |
| 15 | Addressing in TCP/IP networks. Inter-network communication protocols. | 2 |
| 16 | Auxiliary protocols and TCP/IP stack tools. | 2 |
| 17 | Web service and FTP, Telnet protocols. | 2 |
| 18 | Network management system and SNMP protocol. | 2 |
| **TOTAL** | | **36** |

Practical classes should be conducted by a teacher from an akadem group in an audience equipped with multimedia devices. It is advisable that classes are conducted using active and interactive methods, respectively, appropriate pedagogical and information technologies are applied.

## V. Laboratory classes

3- table

| T/R | Topics of laboratory classes | Hour |
|---|---|---|
| **7-semester** | | |
| 1 | Primary networks. Frame-Relay technology. | 2 |
| 2 | IP global Networks. Remote possession. | 2 |
| 3 | Addressing in TCP/IP networks. Inter-network communication protocols. | 2 |
| 4 | Auxiliary protocols and TCP/IP stack tools. | 2 |
| 5 | Web service and FTP, Telnet protocols. | 2 |
| 6 | Network management system and SNMP protocol. | 2 |
| **TOTAL** | | **12** |

## VI . Instructions and recommendations for coursework, course project and calculation graphic work

Coursework, course project and accounting graphic work are not provided for in the curriculum

## VII. Independent Education.

Independent education of a student in “Computing machines, systems and networks " is a component of the process of studying this discipline and is fully provided with methodological and information resources.

4- table

| N | Independent educational topics | Lesson hours volume |
|---|---|---|
| **7-semester** | | |
| 1. | Architecture of computing systems | 4 |
| 2. | The main blocks of the computer are their functions and pointers. | 4 |
| 3. | Architecture, types and their main blocks, functions of the microprocessor. | 4 |
| 4. | External devices and functional characteristics. | 4 |

| | | |
|---|---|---|
| 5. | Microprocessor discharge, local and system interfaces. | 4 |
| 6. | Possibilities of connecting with other types of computing systems. | 4 |
| 7. | The main memory device and its physical structure. | 4 |
| 8. | Static and dynamic RAM. Storage methods of files. | 4 |
| 9. | Analog and digital memory devices. | 4 |
| 10. | Types and functions of information and computing systems. | 4 |
| 11. | Structural organization of information and computing systems. | 4 |
| 12. | Multi-machine and multi-processor computing systems. | 4 |
| 13. | Assessment of the productivity of computing systems. | 4 |
| 14. | Evaluation of productivity by frequency of Takt. | 4 |
| 15. | Peak and real productivity. MIPS and Flops units | 4 |
| 16. | Wired information transmission fans. | 4 |
| 17. | Twisted pair-based cables. Coaxial cables. Fiberglass cables. | 4 |
| 18. | Wireless communication channels. | 4 |
| 19. | Adaptation of technological pointers of communication paths. | 4 |
| 20. | Coding information. | 4 |
| 21. | The main types of computer networks. | 4 |
| 22. | Local computing network topology. | 4 |
| **TOTAL:** | | **88 hour** |

It is recommended to prepare abstracts and make a presentation by students on topics that will be mastered independently.

## IIX. Preachers of supervision and assessment of student knowledge in science

5-table

| | |
|---|---|
| **Evaluation methods** | In other forms such as oral inquiry, testing, interview, control work, homework inspection, written work, presentations and the like |
| **Evaluation criteria** | **5 - ” excellent " grade**<br>- The student makes independent conclusions and decisions;<br>- can think creatively;<br>- independent observation;<br>- can put into practice the knowledge gained;<br>- understands, knows, can express, tell the essence of science (subject), and when it is found to have an idea of science (subject) – is assessed with 5 (excellent) grades.<br>**4 – “good” grade** |

| | | | |
|---|---|---|---|
| | - The student observes independently;<br>- can put into practice the knowledge gained;<br>- understands, knows, can express, tell the essence of science (subject), and when it is found to have an idea of science (subject) - is evaluated by 4 (good) assessments.<br>**3 – "satisfactory " assessment**<br>**-** The student can put into practice the knowledge he has received;<br>- understands, knows, can express, tell the essence of science (subject), and when it is found to have an idea of science (subject) - is evaluated with a 3 (satisfactory) assessment.<br>**2 – "unsatisfactory" grade**<br>- When a student does not master a science program, does not understand the essence of the subject (subject) and is found to have no idea of the subject (subject) - is assessed by an assessment of 2 (unsatisfactory). | | |
| | **Types of assessments** | **maximum score** | **time** |
| | Intermediate control (the conduct of the IC type and the assessment of the student's knowledge of this type of control is carried out by the professor-teacher who conducted training in the subject).<br>Intermediate control is carried out during the semester during training sessions in order to assess the knowledge and practical skills of students after the completion of the corresponding section of the working Science Program. The type of intermediate control can be carried out up to 2 times based on the nature of the subject in each subject, and the form and duration of the transfer are determined by the department based on the nature of the subject, the hours allocated to the subject. When assessing a student by the type of | **5** | 9-16 week |

| | | | |
|---|---|---|---|
| | intermediate control, the grades that he received during training are taken into account.<br>A student who has not submitted an intermediate type of control, as well as an assessment with an assessment of "2" (unsatisfactory) by this type of control, is not included in the final type of control. | | |
| | **Final control**<br>Conducting the final type of control and assessing the student's knowledge in this type of control is carried out by a professor-teacher who has not conducted training sessions.<br>The form of conducting the final type of control is determined by the nature of the science, based on the hours allocated to the science. | **5** | 18-19 week |
| | Written work, Oral, test, etc | **5** | |

## IX. Main and additional educational literature and information sources

### Main literature


1. A. A. Qaxxarov, Yu.Sh. Avazov, U.A Ruziyev. Komryuter tizimlari va tarmoqlari. –T.: “Fan va texnologiya”, 2019. 456 b
2. M.Aripov, B. Begalov, M. Mamarajabov. Axborot kommunikatsion texnologiyalari va tizimlar. Training guide -T:”Noshir”, 2009
3. Олифер В.Г., Олифер Н.А. Компьютерные сети. Принципы, технологии, протоколы. Учебник. -3-е издание. СПб. Питер. 2006г.
4. Бройдо В.Л. Вычислительные системы, сети и телекоммуникации. СПб.: Питер. 2003.
5. Бройдо В.Л. Архитектура ЭВМ и вычислительных систем. Учебник 2 е издание. М.: Форум. 2008.


### Additional literature


1. Mirziyoev SH.M. Buyuk kelajagimizni mard va olijanob xalqimiz bilan birga quramiz. - T.: –Uzbekiston‖ NMIU, 2017. -488 b.
2. Uzbekiston Respublikasini yanada rivojlantirish buyicha Harakatlar strategiyasi tugrisida. -T.: 2017 year 7 fevral, PF-4947-son farmoni.
3. Karl A Astrom, Bjom Wittenmark. Computer-Controlled Systems: Theory and Design, Third Edition. -USA: Dover Publications, 2011 576 p
4. Fritz Klocke. Modeling and Planning of Manufacturing Processes. – Germany Springer, 2016. -658p.


### Internet sites

1. www.ru.wikipedia.org.
2. www.intuit.ru/department/informatics/intinfo/
3. http://www.stur.h.16.ru/education/informat/eu.intro/il.htm
4. http://www.junior.ru/students/miroshnikov/pan kod.htm
5. http://www.dstu.edu.ru/iformatics/intdss/index.html
6. http://www.tula.net/tgpu/new/New/informatics/g1.htm
7. http://www.zyonet.uz