

**OF THE REPUBLIC OF AZERBAIJAN**

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**HIGHER EDUCATIONAL INSTITUTION AUTOMATED  
CORPORATE ARCHITECTURE DEVELOPMENT TOOL**

Specialty: 1203.01-Computer Science

Area Sciences: Technical Sciences

**Plaintiff: Arzu Gabil Qizi Aliyev's wish**

Academic degree of Doctor of Philosophy  
to buy a paper submitted in your dissertation

**AVTOREFERAT**

Baku-2022

Dissertation case of Sumgayit State University of Informatics at the department were performed

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Under the President of the Republic of Azerbaijan and the Higher Attestation Commission, the National Academy of Sciences of the Institute of Management Systems operating under ED 1.20 of the Dissertation Council

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## GENERAL CHARACTERISTICS

**Topicality of the topic:** In Azerbaijan, higher education institutions, educational process, quality, degree of improvement, to the international level and developed Europe, Asia and America, higher education, the system is integrated with enterprise software, new technologies, modern computers and information systems are equipped to there was a need. To this end, in the Republic of Azerbaijan in 2015-2020, the Ministry of Education and the National Strategy for the Development of Science related to the implementation of the State Program was approved. Not only the education sector needs to be modernized in connection with the 20th, a State Program has already been adopted.

New information technologies and computer equipment, the latest achievements from the corporate information system. As you know, corporate information systems of large enterprises of the working sphere, connecting corporations of all economic, production, research, educational, administrative, financial and accounting, business, integration of divisions and enterprise quality products that ensure the production of complex automated technical, software and information tools commonality. Specialization depending on the field, in a higher educational institution for a society of trained specialists, training for the implementation of the educational process of all departments between corporate interaction and information relations of the organization of the modern period is considered one of the most relevant issues.

In higher education institutions (HEI), highly qualified, international requirements for training specialists, their work in enterprises in order to ensure the educational process, improve the quality of students in scientific and practical work, and business inclusion issues in higher education institutions, these important issues are not considered. But, considering these works of high *səmərəsinə* to achieve modern information systems, intelligent software, tools, corporate management systems and computer technologies, the latest achievements to apply this is important.

HEİ information, operating numerous educational, research, economic, etc. auxiliary departments, the operation of a centralized manner, modern information and computer technologies, through the educational process, research papers, business process avtomatlaşdırılmasını and management, as well as to provide corporate information systems (KIS), its software, technical and information support application of funds is provided. Higher education institutions existing KIS-media analysis shows that in selected qualified higher education for systems in the learning process and research areas, adaptations that, in contrast to enterprise software, enterprise network tools, electronic documentation tools, tools, databases, management systems, and other tools are used. In particular, the engineer-oriented HEİ's to be very functional, skilled, complex in nature and interfeysli KIS that again the creation and application of HEİs is a long-term and step-by-step process. In this sense, the HEİ is included in the educational process in order to improve the quality of management and control of automation provision, research work according to international standards, deliver and perform the ability of scientific papers, results of kommersiyalaşdırılmasını to provide new algorithms, models of corporate governance, software, tools for creating a scientific point of view, the relevant issue is also considered in the dissertation, the questions posed. In this regard, the dissertation deals with the case of Sumgait State University (SSU) Faculty of Engineering on the example of its educational, research and innovation-production divisions of the complex for automating corporate management of algorithmic, technical, software and information tools., The research is devoted to the development and analysis of experimental data.

**Purpose of the work:** HEİ's of the educational process, research and innovation activities, automation and management, providing corporate information systems, software, information and software tools, use.

These goals are designed to achieve the following main issues:

- Higher educational institutions (SSU-UNESCO Faculty of Engineering by example) for automation and management of corporate information systems in architecture development;
- SSU-UNESCO Faculty of Engineering Automated Corporate Information system, functional diagram, based on the educational process of the algorithm development activities;
- SSU-UNESCO Faculty of Engineering Automated corporate Information system, functional diagram, based on scientific papers, activities in of the algorithm development;
- Higher education institutions of the automated corporate information system for technical support of the device, selection and justification of of the algorithm development;
- Selection of technical means of the corporate network of the Faculty of Engineering of SSU and establishment of the addressing scheme according to the routes;
- SSU-UNESCO of the Faculty of Engineering, educational process and scientific work of the corporate information system automation, providing software development

**Research methods.** The paper presents the questions raised for solving modern modeling methods, artificial intelligence concepts and methods automated corporate governance methods were used.

**The main provisions are submitted for defense:**

- Higher educational institutions of corporate governance, tools, comparative analysis and research of investment issues;
- Institutions of higher professional education for automation and management, corporate information systems architecture for software development, selection of tools and their functions, definition;
- Higher educational institution automated corporate information system functional scheme of the educational process based on modeling;
- Higher educational institution automated corporate information system, functional scheme, based on scientific papers, modeling;

- Higher educational institution automated corporate information system technical support selection tools and devices;
- HEI in an automated corporate information system for technical support of structural analysis of conducting operations;
- Creation of the addressing scheme according to the routes of the corporate network on the example of the Faculty of Engineering of SSU;
- Higher educational institutions of corporate software system, development;
- SSU is the director of the Faculty of Engineering, educational process and scientific work of the automated corporate information system of the creation management system database.

**Scientific innovations.** A dissertation for scientific renewal consists of the following actions:

- HEI's (SSU-unesco Faculty of Engineering on the example) of an automated corporate information system for the educational process of activity, an algorithm has been developed;
- HEI's (SSU-unesco Faculty of Engineering on the example) of an automated corporate information system, research papers, activities, an algorithm has been developed;
- HEI's teaching staff in the educational process and scientific work based on the collected rating of balina in accordance with the very principles that determine the employees ' socio-material status, promotion, providing an algorithm is developed.
- HEI's (SSU-unesco Faculty of Engineering on the example) of an automated corporate information system for technical support of the device and selection of funds an algorithm has been developed;

- The choice of technical means of the corporate network of the ATM (on the example of the Faculty of Engineering of SSU) and the addressing model based on the routes were developed;
- HEI's (SSU-UNESCO Faculty of Engineering on the example) of an automated corporate information system, databases that ensure the implementation of the developed algorithm.

### **Practical significance and results of implementation.**

Higher education institution, educational process, scientific work and innovative structure of the automated corporate information system to develop more effective research methods, develop tools that provide algorithms and models developed. Automated corporate information system of technical, software, information and mathematical tools with the use of Sumgayit State University of Engineering Faculty on the example of educational process, scientific and innovative activities works, activities range this issue has been resolved. Building a corporate network based on the principles of Sumgayit State University, based on the Faculty of Engineering faculty IP management systems in the field of effective planning and management, wireless computer network system with researched. Dissertations The scientific results obtained by Sumgayit State University, the educational, research and Innovation Center were tested in the work. The obtained theoretical and practical results in the Republic of Azerbaijan and other higher educational institutions can be used.

**Approbation of the case.** Main results of the work Mathematics and ICT application areas. New educational technologies. International Conference-05-06 June 2014, Ganja, pp. 126-129; New problems of technical sciences and ways to solve them. Collection of articles of the International Scientific and Practical Conference, Ufa, September 1, 2014, p. 32-34; Doctoral students and young researchers of the XX Republican Scientific Conference proceedings. Baku 24-25 May, 2016, pp. 241-243; Questions of application of new information technologies, in the III Republican Scientific Conference, SSU, 2016, pp. 320-321; International Scientific and Technical Conference of Graduate

students and young scientists " Science. Technology. Production", Salavat May 10-12, 2017, pp. 416-418; in the construction of information technologies and systems, applied opportunities and prospects. International Scientific and Practical Conference. Azerbaijan University of Architecture and Construction and Institute of Cybernetics of ANAS, Baku-July 05-06, 2018, p. 110-112; Information systems and technologies: Achievements and prospects of the II International Scientific Conference proceedings. SSU, November 15-16, 2018, pp. 418-420; Information Systems and Technologies: Achievements and Prospects II International Scientific and Practical Conference, SSU, July 09-10, 2020, pp. 211-213 the reports were discussed.

**Dissertation of the case:** name of the organization. The dissertation case of Sumgayit State University of Informatics at the Department was completed.

**Personal contribution of the author.** The author of the study, the main goals and to achieve them, the questions raised, indicated the directions of research, was established. Higher education in an institution (HEİ) that applies corporate information systems available in the creation of methods, technical, informational, mathematical, algorithmic and software tools, a comparative analysis is conducted, HEİ's Automated Corporate Information System (ACIS) for automating and managing its overall architecture of teaching and research activities-production and commercial activities schemes have been proposed. Participation in the educational process, which departments, faculty members of the emerging rating calculation algorithm developed, Faculty of automated corporate information systems in the educational process in the submodule use principles have been identified.

**Printed scientific works.** On the topic of the dissertation, 15 papers, including 7 prestigious scientific and practical journals, articles in 8 International and National conferences and symposia were published.



**Dissertation structure and scope.** The dissertation consists of an introduction, four chapters, a conclusion, a list of 164 titles and appendices. The volume of the main content of the work consists of 163,617 characters without tables, figures and bibliography. Including, Introduction -13941 characters, Chapter I -51535 characters, Chapter II-41998 characters, Chapter III-35033 characters, Chapter IV-19176 characters, Result-1934 characters.

## **CONTENT OF THE WORK**

**At the entrance** topics, relevance, purpose of the work, issues to be solved scientific innovations, works, practical significance, etc. the main provisions are indicated.

**In the first chapter** high educational institution (HEI) corporate management systems, information and technical tools, comparative analysis of the putting issue it was found that at present many HEI's-information, information management, corporate computer network within the framework of information exchange, conducting information transfer packets for optimal search paths, so that various methods are used. Based on the analysis of the presented scientific problem, the following research questions were assigned to solve:

1. Sumgayit State University, on the example of corporate information systems will be created to automate and manage its overall architecture activities in the scheme should be created.
2. SSU-UNESCO Faculty of Engineering on the example of a corporate network of a wireless system of technical means, the choice of the algorithm to be developed and network, installation, configuration of resolving issues, should be provided.
3. Algorithms and models should be developed for the selection of routes for the exchange of information between the deans, tutors and departments of the Faculty of Engineering of SSU.
4. SSU-UNESCO Faculty of Engineering educational process, scientific works, production process organization and commercial works for the organization of the corporate system of general information support, the structure should be created and separate

electronic documents, management, database administration, to the algorithms of should be developed.

5. SSU-UNESCO of the Faculty of Engineering on the example of teaching, research, production and commerce for automating the corporate interface of software should be developed.

6. SSU-unesco Faculty of Engineering educational process, Scientific work, Production and Commerce, automation and control for the general software of the device and its software, procedures, operations, development should be necessary.

7. According to the hierarchical structure of the Faculty of Engineering of SSU, electronic document management and software procedures between clients should be planned for the educational, scientific, production and commercial sections of the corporate network.

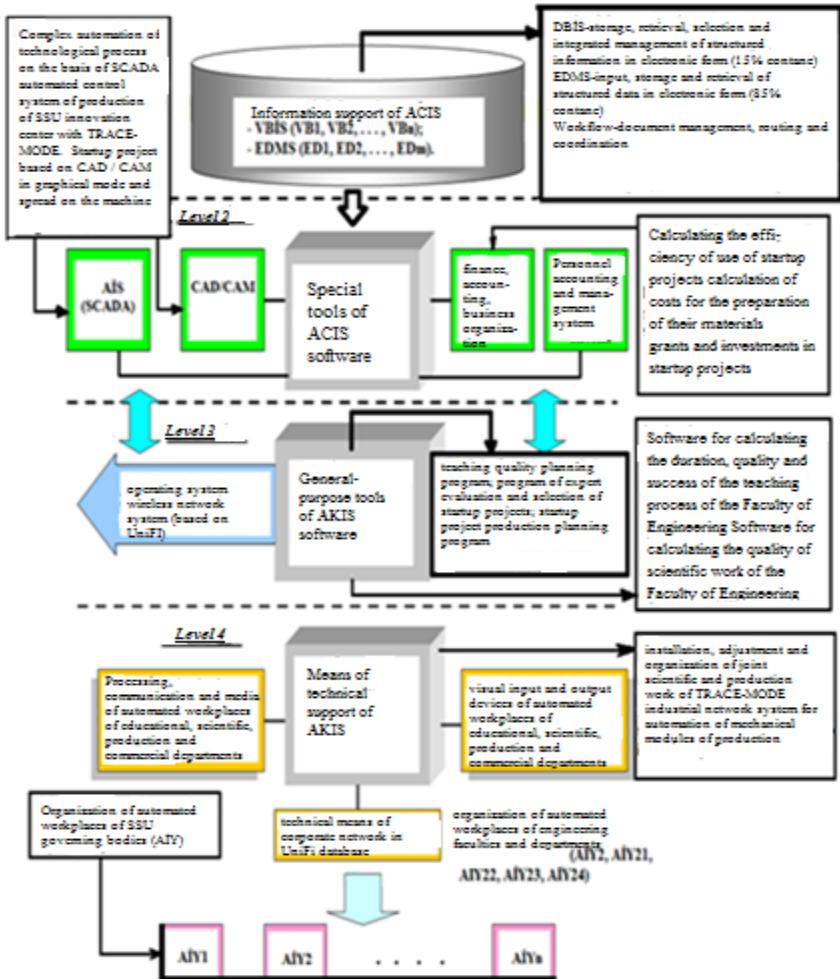
**In the second chapter** SSU-UNESCO of the Faculty of Engineering on the example of a corporate information system for automation and control to provide the means of architecture and development were invested.

In this regard, in a new scheme-based integration running, HEI's Automated Corporate Information System (ACIS) funds assurance architecture is proposed (Fig. 1).

In the first level HEI's information support of the logical system a model in the form of a map. The second level is the special and general purpose software association, which implements the information support of ACIS.

The third level is considered to be the system level. Software operating systems and network tools included in this level include general purpose operations of ACIS (implementation of common management software interface, interaction of service programs), service functions (dispatching, installation, formatting, security, etc.), global (international information). connection) and local (within the enterprise) network procedures on the basis of UniFi.

Fourth level - SSU-the organization of the Faculty of Engineering under the guidance, formation of structures of the educational process, scientific activities, production area of work and



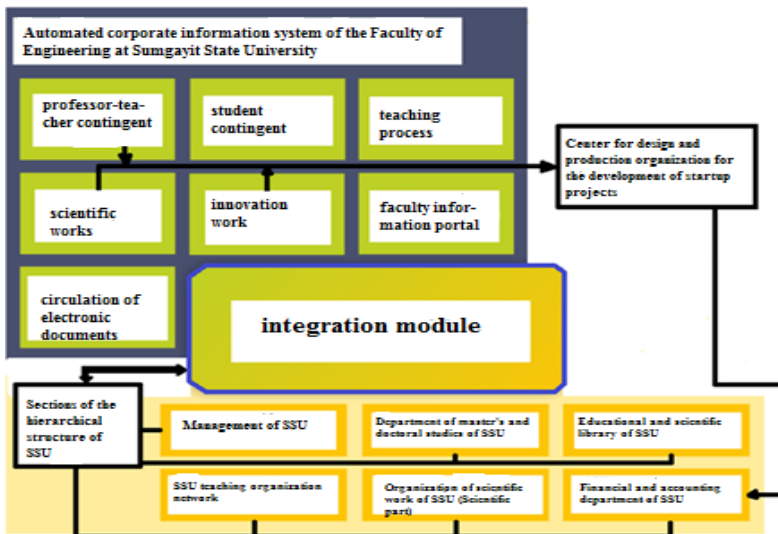
Rice. 1. SSU-UNESCO on the basis of the ACIS Faculty of Engineering should provide a guarantee of the facility.

commercial activities of the Department of automated integration, in order to ensure in each section automated workplaces

their network environment of interaction and information exchange that ensures the corporate network, the system is applied.

SSU-UNESCO Faculty of Engineering Automated Corporate Information System (ACIS) providing tools architecture, taking as the basis of this system planning functions and functional schemes of construction the question is posed. SSU-UNESCO Faculty of Engineering in the educational, scientific, industrial and commercial process of effective integration and SSU-UNESCO management, departments with mutual information exchange, to ensure an automated corporate information system activities, procedures planlaşdırılaraq common functional scheme is being built.

“Engineering\_SSU called” ACIS through the faculty under the guidance of its management functions, necessary to keep all the data in a short time of use. SSU-UNESCO Faculty of Engineering structure interaction between exchange process integrated automation for integration providing Of the ACISmodules functional diagram is proposed (Fig. 2).



Rice. 2. SSU-UNESCO Faculty of Engineering of Automated Corporate Information System, functional diagram

To do this, a chair for employees belonging to a training-oriented database (DB) is created. DB-in  $T_{1,j}$  in the rating of a procedure like,  $k_{1,j}$  its relapse rate, the number, will be met  $T_{1,j}$  Evaluation procedures, considering the Engineering Department faculty of each employee's reporting year, basically, the overall rating can be calculated. Thus, the employee's chair  $R_{ka}$  overall annual rating according to the hesablanılır formula:

$$R_{ka} = k_{1,1} T_{1,1} + k_{1,2} T_{1,2} + \dots + k_{n,m} T_{n,m} \quad (1)$$

here  $k_{1,j}$  – an academic year during each year  $T_{1,j}$  relapse procedure rating number of sales.  $T_{1,j}$  rating procedure, otherwise, in accordance with  $k_{1,j} = 0$ . If the rating, the cost of the procedure taken border within (1÷10-students by the teacher of the contingent quality assessment) if changed and 1÷3 low rating 4÷5 medium rating, 6÷8 high rating, 9÷10, and very high rating how to accept then (2.1) certificate included in the price students by the teacher of the contingent quality assessment ( $T_{2,2}$ ) answers request is mostly provided.

DB-also indicators 5÷10 on the price boundary, and the employee's ability is determined depending on. Standard-prices below the conditions are accepted on the basis of:

$$T_{1,j} = \begin{cases} 4 \div 6, & \text{then the normative is low} \\ 7 \div 8, & \text{then it is the normative medium} \\ 9 \div 11, & \text{then the normative is high} \end{cases} \quad (2)$$

DB rating, prices for university employees, awards of places are selected depending on. In this case, the logical algorithm production is constructed as a rating for selection:

$$\begin{aligned} \text{If } T_{2,4} \text{ (2.4.1) Price Rating} &= 10; \\ \text{If } T_{2,4} \text{ (2.4.2) Price rating} &= 7; \\ \text{If } T_{2,4} \text{ (2.4.3) Rating price} &= 5. \end{aligned} \quad (3)$$

DB - and given a rating procedure depending on the type of higher education institution the employee receives annual bonuses,

indicators, and is formed. This is due to the fact that such rating procedures exist, that their prices for the employee are material, not only their health, physical condition is affected. This principle, taking as a basis, DB-from the university employee incentive (annual material remuneration) rating procedures and prices for them should be selected. Thus, the material rating of rewarding is determined by the procedure  $\mu_{ij}$  weight, coefficient is added. Then  $T_{i,j}$  rating of companies owned by  $\mu_{ij}$  weight coefficient while rewarding rating does not affect what  $(R_i/100\%) H_a$  provided by. If you take into account that the rating of the procedure concerning blocks, the number – 2 of these blocks relate in accordance with the 13 and 14 number of procedures includes, then the teacher-year financially stimulating DB bonus indicators are mainly as shown below calculated

*DB-to the 1st block for*

$$S_{b1} = \frac{\sum_{j=1}^{13} R_{1,j}}{100\%} H_a, \quad (4)$$

*DB-in 2 blocks for*

$$S_{b2} = \frac{\sum_{j=1}^{14} R_{2,j}}{100\%} H_a, \quad (5)$$

here, block 1, and mostly rating, price  $1 \leq R_{1,j} \leq 10$  within the range of changes, block 2-mainly price rating  $1 \leq R_{2,j} \leq 20$  within the range of changes;  $H_a$  - teachers receive a monthly working salary.

Planning the educational process of altmodulunun automatically with the help of the following questions, solutions are provided:

1. Basic and working curricula (Bachelor's and Master's degrees) according to the new standards of formation (Form 1).
2. Departments annual cargo lesson (Form 3) tasks, mainly formation.
3. Chair among employees of the training load, distribution (Form 4).

4. Determine the amount of work and the amount of training required (Form 5).

5. Academic workload departments, formation (Form 6).

Planning the educational process in stages  $i$  parameters are sequentially executed after the hierarchy of structures that kontinquenti approves (subscribes to) and the scanner have been *Form i* The parameters of the departments, faculty and university and the training department are stored in the archive. *Form I* that the preparation, approval, and use stages of a flowchart are in the form of a proposed one. Chair of Russian employees (in the state of which, contract with the employee or hours in the account, working), position, full state, half in the state of which, hours in the account, lectures, practical classes, laboratory, other hours, vacancies, industrial practice, general lesson department.:

$$DY_{general} = \sum M_{t/y.i} + \sum M_{y/y.i} + \sum M_{s/h}, \quad (6)$$

here is a complete list of teachers from lectures, practical classes, lab and other hours (hourly, experience, etc.). algebraic total calculated.

**In the third chapter** SSU in an automated corporate information system for technical support of the device, the choice and justification of the issue are considered. SSU-UNESCO Mechanical Engineering Faculty of the University architectural structures mainly Faculty of corporate network, hierarchies, levels have been defined:

1. System-wide and special software;
2. Services system (www email address, work groups, and funds);
3. Data management system;
4. Network operating systems;
5. Data transfers to the network (subsystems transport);
6. Data storage and transmission to the central server).

SSU-UNESCO Faculty of Engineering of the corporate network of technical support in the development of its qualitative parameters in order to ensure the length of time transmitted over the network

information, the amount of assignment from the network without on the ability to assign the question of:

$$C = V_x \max\{I_{xy}\} = V_x \max\{H_y - H_{y/x}\} \text{ (bps)}. \quad (7)$$

here  $H_y - H_{y/x}$  – encoder entropy and channel entropy account;  $I_{xy}$  – informativeness transmissions (bps);  $V_x$  – information, is the speed broadcasts.

(7) expression while valid happens that the HEI in the corporate network discrete channels, the flow of information during errors does not happen. If we take into account that HEIs in a corporate network organize discrete channels and the network uses a binary symmetric channel, the information flow during (0 and 1)  $p_0$  there is a high probability of errors. Therefore, in (8), the expression of a certain *çevirmələrdən* by means of the network Special abilities The indicator, as shown below, is assigned to:

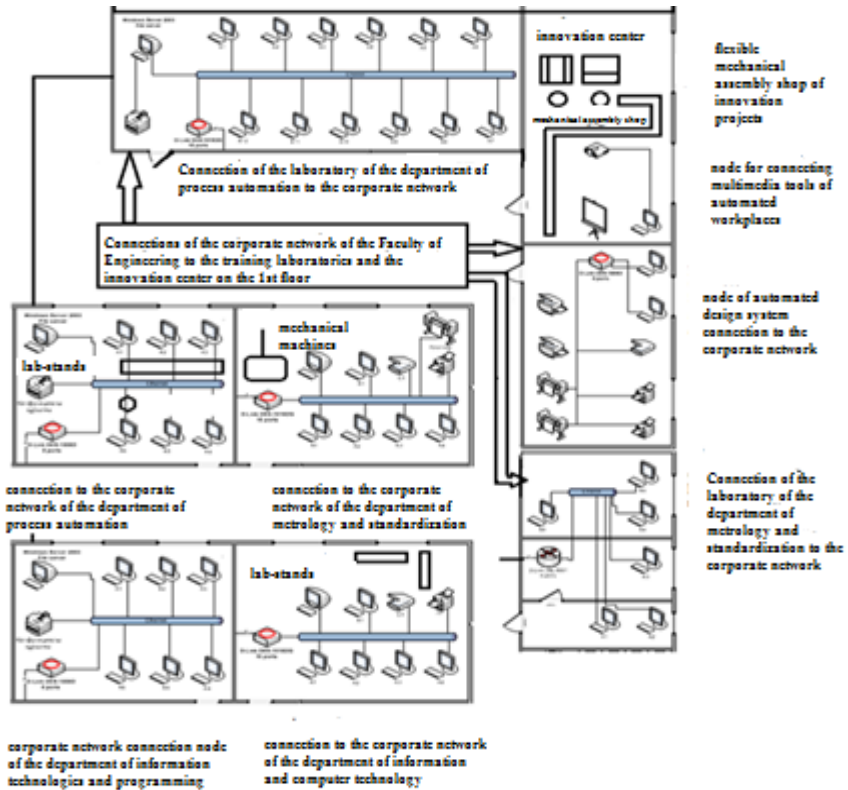
$$With = V_x [1 + p_{he} \log_2 p_{he} + (1 - p_{he}) \log_2 (1 - p_{he})] \quad (8)$$

here  $p_0$  – corporate network binary error channel, assumption;  $V_x$  – is the speed of information transmission.

SSU-unesco Faculty of Engineering of the dean's officem and departments in the 1st building, 1st and 2nd floor, where  $M_i$  positions (fig. 3) in accordance with the individual AWP<sub>i</sub>the media architecture is being formed. APM<sub>i</sub>- have an architecture in accordance with the Faculty of Engineering of the corporate subnet SSU structure in the corporate network and in relation to the interface and routes, directions, most and release capacity it is being installed. Corporate networks release capacity to increase koaksil, the cable from wires is used.

Corporate network affairs, one of the indicators of TCP protocols loss of 5 ÷ 15 % on the wall is is stable maintenance. Because above this figure, when, that is, TCP protocols are at 40%, and about network loss, almost non-working ones show that. This principle, given that traffic costs reduces the probability and registration of delivery requests is to minimize delays. This is if you take into account that the following conditions are not accepted:





Rice. 3. SSU-Faculty of Engineering at the Faculty of Departments and Innovation Center in the topoloji corporate network.

$$f(t_{request}) = F(t_{sorğu_i}/2) + S/t_{sorğu_i} \rightarrow ths \quad (9)$$

here  $t_{sorğu_i}$  – Engineering Faculty of of the dean’s officen, departments and innovation center, users of outgoing requests, time. This parameter takes two times the delivery time (forward and reverse) -  $0 \div 1200$  Ms, and changes at the border. (10) an expression from the specified query with a majority of  $0 \div 1200$  Ms of the to a minimum indicator belongs to  $100 \div 600$  Ms can be accepted.

Faculty of Engineering of the Corporate Network məhsuldarlığının to evaluate the queuing system models, a comparison between the two

is being conducted. M/M/1 and G/M/1 models using the input queue access length, average and maximum indicators, first of all, the average waiting time in the settings assigned was, in the corporate network, performance is checked. Poisson distributions are in the frequency range, so incoming network polls, between, when distribution intervals with the exponential provided function.

$$F(x) = 1 - (e^{-\lambda x}) \quad (10)$$

Pareto probability distributions the function distribution has:

$$F(x) = 1 - (\lambda / x)^\alpha \quad (x > k; \alpha > 0) \quad (11)$$

ACIS Engineering Faculty will become non-exponential external influences when processes to reflect GPSS World environment simulation models are asked to create. Introduction of information as a generational GPSS environment is used. Waiting times, upkeep times, length changes, overloading systems depending on the GPSS-in installed by subsystems are measured. For example,

$$\rho = \lambda / \mu, \quad (12)$$

here  $\lambda$  - introduction of light output information medium intensity;  $\mu$  - service requests of the average intensity process.

Pareto distribution is slowly disabling the distribution of parameters of random variables of the minimum price and random values of the average price, dispersion due to columns. Pareto  $\lambda$  - parameter distribution,  $x$  randomly quantity that can get, the minimum price that appoints.  $\alpha$  - random values of the average price and dispersion assigns. If  $\alpha$  is a parameter from 1 to 2, like price if, then random quantitative finite higher and infinite dispersion has. Ethernet traffic for individual sources  $\alpha$  parameter 1,2 the cost is equal to. Internet traffic, and Pareto distributions with  $1.16 \leq \alpha$  meets the condition.  $\lambda$  the parameter is selected so that M/M/1 of the loading model is equal. M/M/1 modeling systems show that M/M/1 are the main characteristics, which are, average length queues, maximum

queue length, queue, average waiting time in a medium content system, time is low. P/M/1 and M/M/1 systems are the difference between the estimate for holding the input queue of requests of length average and maximum indicators, primarily the highest latency, time, parameters and the corporate network as a whole yield in the following Boolean expression is checked:

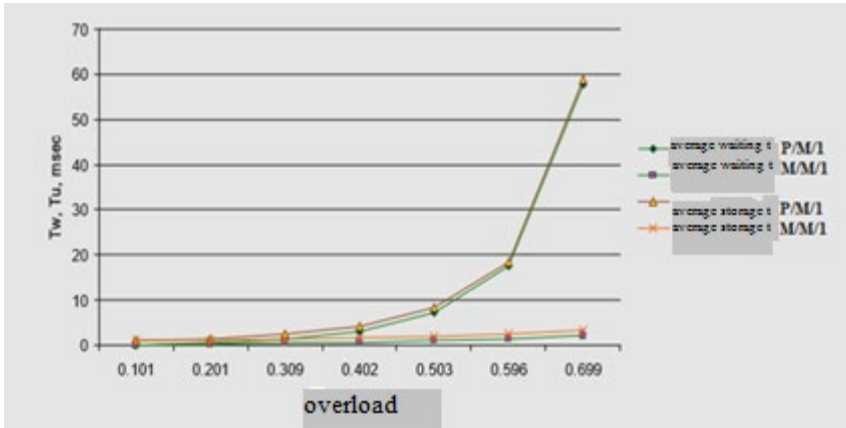
- If  $p \leq 0.1$ , Then systems when loading P/M / 1  
In the M/M/1 price system  
there is no difference between the big ones;*
- If  $0.1 \leq p \leq 0.3$ , Then systems when loading P/M / 1  
unlike the previous M/M / 1 system  
The indicator system increases several  
times;*
- If  $0.3 \leq p \leq 0.7$ , Then systems at boot  
P/M/1 and M/M/1 between systems  
the difference is growing 10 times;*
- If  $p > 0.7$ , Then systems at boot  
P/M/1 and M/M/1 between systems  
the difference is many times.*

According to the logical expression, the dependence of the average waiting and latency times of the system load from 0.1 to 0.7 for exponential and similar cases can be described graphically. (Fig. 4).

Corporate networks are already loading in time, i.e.  $\rho > 0,7$  If P/M/1 and M/M/1 are systems, the difference between 60 times increases, which polls the queue of metrics increases the value. Conducted tests, basically, it can be noted that the logical expression  $p \leq 0.1$  and  $0.1 \leq p \leq 0.3$  conditions that work in the corporate network.  $\rho$  the indicator is more efficient than productivity.

For the MM / 1 model, which consists of exponentially distributed time interval queries, the parameters of the dependence of the required buffer size  $q$  on the average load factor  $\rho$  must be analyzed. For this Faculty of Engineering corporate network, the

Dean's office and the Department between tire exchange scheme, mainly in the buferinin network required measures in accordance with the average load factors determined (Table 1).

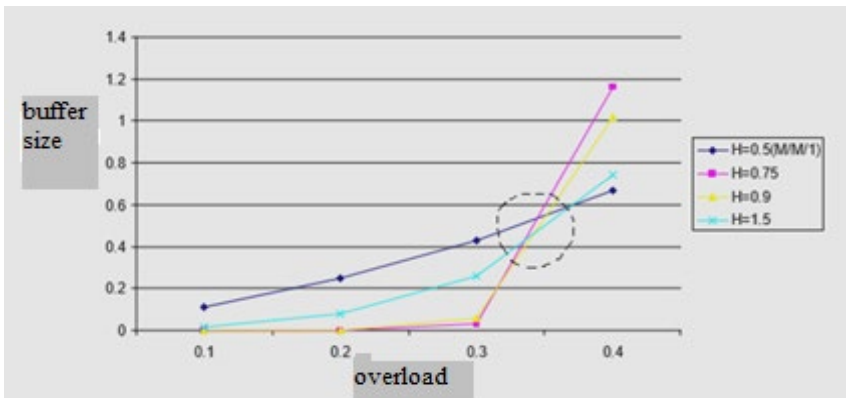


Rice. 4. Average waiting time and content of the system's leisure 0.1- to 0.7 V before loading eksponensial and similar situations for addiction graphics

According to the tire distribution scheme between the dean's office and departments of the corporate network of the Faculty of Engineering, the dependence schedule between the service exponential distribution intervals and time exponential distribution intervals of MM / 1 was established. (Fig. 5).

Table 1

$\rho$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
H=0.5 (MM/1)	0.111	0.25	0.428	0.667	1	1.5	2.33	4	9
H=0.92	1.89E-06	0.00056	0.033	1.159	38.05	1547.9	110909	27068704	1.64E+11
H=0.9	2.58E-05	0.0024	0.06	1.016	16	296.6	8538.8	640000	5.9E+08
H=0.75	0.0137	0.078	0.262	0.740	2	5.625	18.148	80	810



Rice. 5. MM / 1's service system based on size loading system dependence of buffers

Faculty of Engineering in the corporate network effectively performance to provide a load indicator of 0.3 to and shown in the figure size 0.5 can be considered, this is approximately  $0,1 \leq \rho \leq 0,3$  matches the becomes condition. Photo 6 as seen from the network download  $\rho = 0,3$  and the size shown in the picture is  $H=0,5$  in the case of graphs, the nearest areas of intersection can be observed.

In the example of the Faculty of Engineering of SSU shown in Figure 3 and Figure 4, automated workplaces (AWP) are organized at the level of technical support of ACIS. The management functions of the faculty, which belong to the dean of the Faculty of Engineering of SSU, are carried out on the basis of assignment requests through AIY<sub>1MD</sub>. SSU-UNESCO Faculty of Engineering Corporate Network through a semester and a session during the educational process, scientific work and implementation of the innovation center works automation to ensure active and passive network equipment, networks, protocols and technologies are used. Electronic documentation of educational and scientific works of the Faculty of Engineering, sending to the necessary addresses, assignments, decisions, orders, etc. by the leadership of SSU. In order to ensure the receipt of electronic documents and their sending

to the relevant departments, the dean's contingent's  $AIY_2 MK_i$  ( $i = 1,4$ ) are connected to the local corporate network of ACIS.

Faculty of Engineering of of the dean's office Corporate Network, Departments and Innovation Center  $APM_{ij}$ -in the periods between effective interaction, information exchange at high performance to ensure the following goals, functions, is accepted: of the dean's office, departments and innovation center  $APM_{ij}$ -in the periods between  $t_{ij}$  transition to minimization

$$\min_{x_{ij}} \sum_{i=1}^n \sum_{j=1}^m t_{ij} x_{ij} \quad (13)$$

here  $n$  - of the dean's office, departments and innovation center  $APM_{ij}$ -in the periods between the input number of links;  $m$  - of the dean's office, departments and innovation center  $APM_{ij}$ -in the periods between events, the number of links;  $x_{ij}$  -  $APM_{ij}$  Among other things, the connection reflects.

We will accept the Faculty of Engineering in each structure belonging to  $APM_{ij}$  - parameters  $x_i$  sets the following are expressed as:

$$x_i \{ x_1, x_2, \dots, x_7 \},$$

here  $x_1$  - of the dekan  $ARM-i$ ;  $x_2$  - of the tutor  $ARM-i$ ;  $x_3$  - of the chair1's (Department of Automation Processes)  $ARM-i$ ;  $x_4$  - chair2 (Department of Metrology and Standardization)  $ARM-i$ ;  $x_5$  - chair3-reputation (Department of Information Technologies and Programming)  $ARM-i$ ;  $x_6$  - chair4-Reputation (Department of Information and Computer Engineering)  $ARM-i$ ;  $x_7$  - Innovation Center  $ARM-i$ .

Faculty of Engineering of each corporate network structure within  $ARM-am$  between the input and output information, the relationship is given and if we assume that  $APM$  parameters between the input and output relations are there, then matrix expressions are in the cells relations in case 1 written below expressions can be written:

$$x_{ij} =$$

$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$	$x_7$	
$x_{11}$	$x_{12}(\zeta)$	$x_{13}(\zeta)$	$x_{14}(\zeta)$	$x_{15}(\zeta)$	$x_{16}(\zeta)$	$x_{17}(\zeta)$	$x_1$
$x_{21}(g)$	$x_{22}$	$x_{23}$	$x_{24}$	$x_{25}$	$x_{26}$	$x_{27}$	$x_2$
$x_{31}(g)$	$x_{32}$	$x_{33}$	$x_{34}(\zeta)$	$x_{35}(\zeta)$	$x_{36}(\zeta)$	$x_{37}(\zeta)$	$x_3$
$x_{41}(g)$	$x_{42}$	$x_{43}(g)$	$x_{44}$	$x_{45}(\zeta)$	$x_{46}(\zeta)$	$x_{47}(\zeta)$	$x_4$
$x_{51}(g)$	$x_{52}$	$x_{53}(g)$	$x_{54}(g)$	$x_{55}$	$x_{56}(\zeta)$	$x_{57}(\zeta)$	$x_5$
$x_{61}(g)$	$x_{62}$	$x_{63}(g)$	$x_{64}(g)$	$x_{65}(g)$	$x_{66}$	$x_{67}(\zeta)$	$x_6$
$x_{71}(g)$	$x_{72}$	$x_{73}$	$x_{74}(g)$	$x_{75}(g)$	$x_{76}(g)$	$x_{77}$	$x_7$

$$x_{ij} = \begin{cases} 1, & \text{if there is an internal and an external connection;} \\ 0 & \text{-if there is not a connection} \end{cases}$$

Faculty of Engineering corporate network, selected information transmission routes, minimum time, in total emaletm time and system, occurs mainly assigned to the network  $M_{my}$  the overall performance of the corporate network in the required indicators, having technical means of to be selected foundation.

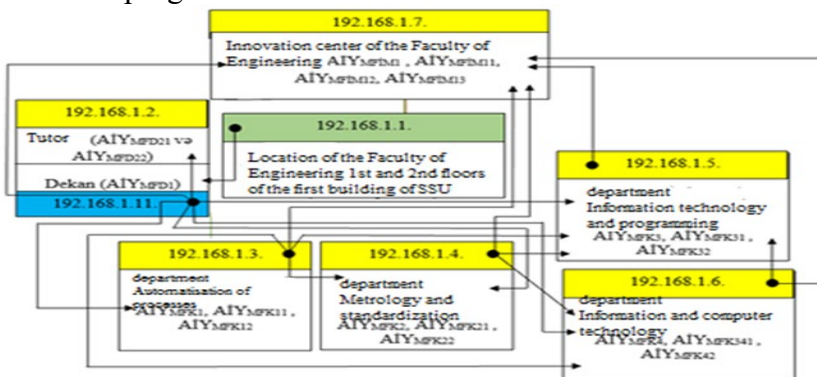
The dean's office of the engineering faculty, departments, their laboratories, innovation center and its research laboratories, corporate network system organized in the commercial department, workplace, switchboard and distribution point of the administrator providing wireless information exchange work on the basis of 2 standards: 802.11gn or 802.11n. Faculty of Engineering Corporate Network data Transfer rate 100 Mbit / s see you later. Faculty of Engineering Automated workstations (20 node-based corporate LAN inside the union, interaction, exchange of information to provide 192.168.1.1÷192.168.1.8 IP addresses). Faculty of Engineering in educational and scientific works, innovation center of local area network for users, 20 (1 spare) workstations; and other network tools are used. In this case, the netmask, 20.20.20.0 is taken as.

Domain names, the creation of nested to needs, mainly the Engineering Faculty of the corporate network, information sections of routes, planning is carried out by the process.

According to the requirements for the creation of domain names, the process of planning the routes of information areas of the corporate network of the Faculty of Engineering is carried out. Figure 6 shows the schedule of the IP addressing scheme between the dean's office, departments and the innovation center in the corporate network of the Faculty of Engineering, based on the planned routes.

**In the fourth chapter** SSU-UNESCO Faculty of Engineering on the example of KIS-in for automation of special software, putting development issue, ACIS should provide level 1 architectures, mainly information support, software modules are created:

1. Data collection and primary processing of the software module;
2. Data extraction, program module loading conversion;
3. Data of information warehouses of the software module;
4. In the data information showcase presentation of the software module;
5. Software module analysis data;
6. Web portal to the program module. Servers for use at SSU in the Engineering Faculty Of the ACIS information resources, software, hierarchical program interface modules are used.



Rice. 6. Faculty of Engineering of the IP Corporate Network addressing scheme

Menu commands used by the dean's office (dean of the faculty and tutors) at the upper hierarchy level include the page of electronic inquiries (based on the requirements of the principles of Bologna



education) for the implementation of the stages of the teaching process of the faculty.

Of the dekan's office database server (DDBS) relyasion method created, accurate data from the database is generated. Specialties Mechanical Engineering by DDBS's individual specialties in the database for the current academic year for the specialties standards, curricula (form 1), academic tasks (Form 2), in individual departments and their employees educational cargo (Form 3), chair among employees educational cargo distribution (Form 4), in the department work volume, quantity (Form 5), departments, academic cargo (Form 6) are stored. Academic year of the educational process, high to ensure the quality of DDBS on the basis of the faculty of teaching management is carried out, i.e. DDBS on the following management procedures are used:

1. continuity students providing in each lesson electronic registration is planned. Groups in the electronic journal (electronic journal of the group) of taught subjects, for each student after registering the data in memory that is stored in the journal, additional changes cannot be made.

2. electronic journal of the group-in and other functions, such as for each student in each subject individually free topics of work, deadlines (during the semester within-within 3 months free cases, topic, issue date and delivery deadline), records performance (electronic resources, use of topic-related questions and answer entries), their assessment (2 (unsatisfactory), 4 (satisfactory), 6 (good), 8 (very good), 10 (excellent)) procedures are carried out.

3. Laboratory work to perform electronic journal of the group in a special electronic page is used. On this page, students are assigned to the laboratory work number, each-in the laboratory for work assignments, deadline, cavablandırma and evaluation, procedures are carried out.

4. Semester by taught individual disciplines students ' knowledge current scores for each-student conducted of colloquium's electronic journal of the group-do scores in let's do, at the end of semester 4of colloquium (per month 1 colloquium) average score is calculated.

5. At the end of the semester, individual disciplines of students are taught - assessment of knowledge for each-student conducted exams electronic journal of the group do scores in let's do, sessions, ticket exams 5 toto from the answers total score calculated.

Form 3 to the department, mainly when the same lesson to implement for the teacher, electronic educational and scientific journal (EESJ) is created. EESJ in the main electronic following pages software modules include:

1. Subjects taught electronic calendar thematic plan;
2. Teachers ' electronic individual plan (academic year, per-teacher lesson load, planned methodological and scientific papers, topics, execution schedule);
3. Academic subjects that are included in konspektinin lectures, practical classes, lessons and laboratory works in electronic version;

The educational process in connection with the department in the database of the following information, based on the software modules page is determined.

Innovations in the center are applied to automated workplaces, duties due to the center, database servers creation, designer-design works maintenance and mechanical machines with the help of startup projects of mechanical parts of the car development of technological processes of automation and management, as well as modern software, training tools and startup projects of commercialization for training, conducting, providing. In addition, coming from the Faculty of Engineering, ACIS must provide common software logged into the interface connected to and innovation center ARM-media, providing activities in the following databases software, modules are created:

1. Faculty of Engineering Innovation Center (FEIC) database server software module;
2. FEIC in Constructor-design and production divisions of the database software module;
3. FEIC-in process automation and control, sector, database software module.

## DISSERTATIONS MAIN RESULTS OF THE WORK

1. Higher Education Institution (SSU-UNESCO Faculty of Engineering on the example) corporate information system automation and management to provide tools architecture proposed in the corporate information system sub-modules functional diagram is constructed.
2. SSU-UNESCO Faculty of Engineering automated corporate information system of the educational process in a flowchart in a relay way, a database that combined actions, an algorithm developed and planned procedures were identified.
3. SSU-UNESCO Faculty of Engineering, departments, staff of the types of research papers being conducted, databases and their ratings, evaluation algorithm used, ACIS, and functions have been identified.
4. Higher Educational Institution automated corporate information system technical support device, selection and justification for SSU-UNESCO Faculty of Engineering on the example of its of the dean's office, departments and innovation center of the corporate network, scheme based on qualitative and quantitative parameters that ensure the corporate network bandwidth and network usage, load at target yield, and algorithms are developed.
5. SSU-unesco Faculty of Engineering on the example of HEI in an automated corporate information system of technical support, building for the justification of graph theory based on structural analysis, models are developed.
6. In order to determine the addressing criteria of the corporate network of the Faculty of Engineering, a functional scheme of interest fields and IP addresses of the institutions belonging to the faculty was proposed
7. SSU-UNESCO Faculty of Engineering Management, Scientific and Educational Process for Quality Improvement Of the ACIS software, information resources, modules, created with their help functional scheme based on the management server database, algorithm developed.

8. Of the dekan's office Faculty, departments and innovation center, organized educational process and scientific work database management algorithm, based on Of the ACIS software developed.

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