## SYLLABUS

## Spring semester 2020-2021 academic years

## on the educational program "Information systems "

| Discipline's code                   | Discipline's title                            | Indepen                         | No. of           | hours p  | er week    |                 |                 |                                  | Numbe           | Independent             |  |
|-------------------------------------|---|---------------------------------|------------------|----------|------------|-----------------|-----------------|----------------------------------|-----------------|-------------------------|--|
|                                     |   | dent<br>work of                 | Lectu            | Pra      | ctical tra | ining           | Labor           | a                                | r of<br>credits | work of<br>student with |  |
|                                     |   | students                        | res              | (PT)     |            | Ū               | tory            | ,                                | cicuits         | teacher (IWST)          |  |
|                                     |   | (IWS)                           | (L)              |          |            |                 | (Lab            | )                                |                 |                         |  |
| OIS2301                             | Basics of                                     |                                 | 1                |          | 0          |                 | 1               |                                  | 2               | 6                       |  |
|                                     | Information                                   |                                 |                  |          |            |                 |                 |                                  |                 |                         |  |
|                                     | Systems                                       |                                 |                  |          |            |                 |                 |                                  |                 |                         |  |
|                                     |   | Academ                          | ic course        | e inform | nation     |                 |                 |                                  |                 |                         |  |
| Form of education                   | Type of course                                | Types                           | of lectur        | es       | Туре       | s of pract      | ical            | Nur                              | mber of         | Form of final           |  |
|                                     |   |                                 |                  |          |            | training        |                 |                                  | IWS             | control                 |  |
| Online/blended                      | Profiling                                     | Met                             | thodical         |          |            | blended         |                 |                                  |                 | Test in Moodle          |  |
| Lecturer                            | Bakibayev Adil Valikh                         | anovich                         |                  |          |            |                 |                 |                                  |                 |                         |  |
| e-mail                              | Adil.bakibayev@gmai                           | il.com                          |                  |          |            |                 |                 |                                  |                 |                         |  |
| Telephone number                    | +7 777 582 52 58                              |                                 |                  |          |            |                 |                 |                                  |                 |                         |  |
| Academic presentation of the course |   |                                 |                  |          |            |                 |                 |                                  |                 |                         |  |
| Aim of course                       | Expected Learning Outcomes (LO) Indicators of |                                 |                  |          |            |                 | ors of L        | LO achievement (ID)              |                 |                         |  |
|                                     | As a result of studyin                        | g the discipl<br>will be able t | ine the u<br>:o: | ndergra  | aduate     | (               | for eacl        | r each LO at least 2 indicators) |                 |                         |  |
| The course is                       | LO 1 Know the basic                           | c concepts a                    | and defir        | nitions  |            | ID 1.1          | Kno             | w tl                             | he basic        | c processes of          |  |
| designed to                         | associated with infor                         | mation syst                     | ems, as          | well as  | the        | information     | ation tr        | ansf                             | formatior       | 1                       |  |
| familiarize students                | collection, transmissi                        | on, process                     | ing and          | storage  | e of       | ID 1.2          | know            | the                              | basic ap        | proaches to the         |  |
| basics of information               | information.                                  | -                               | -                | -        |            | design          | 01 1110         | rmat                             | tion syste      | ems;                    |  |
| transfer in                         | LO 2 To be able to b                          | uild a mode                     | el of the        | inform   | ation      | <b>ID</b> 2.1 t | be able         | able to independently analyze    |                 |                         |  |
| information systems,                | process, to solve the                         | problems of                     | f optimiz        | zing th  | e          | the sub         | ject are        | ea                               |                 |                         |  |
| information                         | information process.                          |                                 |                  |          |            | <b>ID</b> 2.2 ł | be able         | to ic                            | dentify th      | ne information          |  |
| measuring systems                   |   |                                 |                  |          |            | needs of        | of resea        | rche                             | ers,            |                         |  |
| with each other and                 | LO 3 To be able to u                          | se file struc                   | ctures to        | impler   | nent       | ID 3.1          | be              | able                             | e to de         | fine and use            |  |
| matching their                      | the database. information                     |                                 |                  |          |            |                 | ation sy        | yster                            | ms,             | tantly build a          |  |
| the characteristics of              |   |                                 |                  |          |            | concer          | ue ab<br>tual m | ne to<br>ndel·                   | o compe         | cultury build a         |  |
| the control object,                 | <b>IO 4</b> Hove skills in t                  | rectical on                     | plication        | of       |            |                 | own th          | e no                             | ,<br>prmalizat  | ion procedures          |  |
| mastering the                       | information fundame                           | nactical ap                     | pheation         | 1 01     |            | for buil        | ding a          | data                             | abase lav       | out,                    |  |
| methods of optimal                  |   | 111.015                         |                  |          |            | <b>ID</b> 4.2   | own             | relat                            | tional al       | gebra to form           |  |
| coding in information               |   |                                 |                  |          |            | correct         | querie          | s.                               |                 | -                       |  |
| transmission and                    |   |                                 |                  |          |            |                 |                 |                                  |                 |                         |  |

| processing systems.   |   |  |  |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|--|--|
| Prerequisites   | Algorithms, data structures and programming", "Mathematics 1".  |  |  |  |  |  |  |  |  |
| Post requisites   | esign of information systems", "Information security and information protection".   |  |  |  |  |  |  |  |  |
| Information<br>resources  | <ol> <li>Sambetbaeva A.K., Zhumanbaeva A.M., Fundamentals of information systems. Association<br/>of higher educational institutions of Kazakhstan, 2016</li> <li>Arthur M. Langer, Analysis and Design of Information Systems. Third Edition. Springer-<br/>Verlag London Limited 2008<br/>Available online: Additional study material for the discipline, as well as documentation for homework and<br/>projects, will be available on your page at univer.kaznu.kz. in the UMKD section.</li> </ol>  |  |  |  |  |  |  |  |  |
| Academic policy of  | Academic Behavior Rules:  |  |  |  |  |  |  |  |  |
| the course in the<br>context of university<br>moral and ethical<br>values | <ul> <li>All students have to register at the MOOC. The deadlines for completing the modules of the online course must be strictly observed in accordance with the discipline study schedule.</li> <li>ATTENTION! Non-compliance with deadlines leads to loss of points! The deadline of each task is indicated in the calendar (schedule) of implementation of the content of the curriculum, as well as in the MOOC.</li> <li>Academic values: <ul> <li>Practical trainings/laboratories, IWS should be independent, creative.</li> <li>Plagiarism, forgery, cheating at all stages of control are unacceptable.</li> </ul> </li> </ul> |  |  |  |  |  |  |  |  |
|   | - Students with disabilities can receive counseling at e-mail ******@gmail.com.   |  |  |  |  |  |  |  |  |
| Evaluation and attestation policy   | Criteria-based evaluation:  |  |  |  |  |  |  |  |  |
|   | assessment of learning outcomes in relation to descriptors (verification of the formation of competencies in midterm control and exams).  |  |  |  |  |  |  |  |  |
|   | Summative evaluation: assessment of work activity in an audience (at a webinar); assessment of the completed task.  |  |  |  |  |  |  |  |  |

CALENDAR (SCHEDULE) THE IMPLEMENTATION OF THE COURSE CONTENT:

| weeks | Topic name | LO | ID | amount | Maximum | Form of    | The         |
|-------|------------|----|----|--------|---------|------------|-------------|
|       |            |    |    | of     | score   | Knowledge  |             |
|       |            |    |    | hours  |         | Assessment | Form of the |
|       |            |    |    |        |         |            | lesson      |
|       |            |    |    |        |         |            | / platform  |

|   | Module 1 Principles and Constraints of Software Engineering  |      |         |   |   |      |   |  |  |
|---|--|------|---------|---|---|------|---|--|--|
| 1 | <b>Lecture 1.</b> Introduction The concept of information systems, their role in management. The life cycle of information systems (IS). | LO 1 | ID 1.1. | 2 | 4 | QS 1 | Introductory<br>lecture<br>(synchronousl<br>y) link in the<br>schedule of<br>the Univer<br>system |  |  |
|   | Lab 1. Information systems components.   | LO 1 | ID 1.1. | 1 | 7 | TK 1 | Task record №<br>1<br>(asynchronous<br>ly), link in the   |  |  |

|   |  |          |             |                |    |      | Univer system schedule  |
|---|--|----------|-------------|----------------|----|------|---|
|   | Deadline Satu  | rday 12. | 00 pm QS 1, | TK 1           |    |      |   |
| 2 | <b>Lecture 2.</b> Composition and general structure of information systems. Classification of IS.                                | LO 1     | ID 1.1.     | 2              | 4  | QS 2 | Lecture No. 2<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|   | Lab 2. Acquaintance with the concepts<br>"element, subsystem; structure and<br>communication "on the example of a<br>specific IS | LO 1     | ID 1.1.     | 1              | 7  | TK 2 | Task record №<br>2<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule      |
|   | Deadline Satu  | rday 12. | 00 pm QS 2, | TK 2           |    |      |   |
| 3 | <b>Lecture 3.</b> Methodology and technology for the development of information systems.   | LO 1     | ID 1.1.     |                | 4  | QS 3 | Lecture No. 3<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|   | Lab 3. Development of IS.  | LO 1     | ID 1.1.     |                | 7  | ТК З | Task record №<br>3<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule      |
|   | IWSP 1 Consultation on the implementation of IWS1  | LO 1     | ID 1.1.     |                |    |      |   |
|   | IWS 1. (Abstract)  | LO 2     | ID 2.1.     |                | 20 | IT 1 |   |
|   | Deadline Saturda   | y 12.00  | pm QS 3, TI | <b>X 3, IT</b> | 1  |      |   |
| 4 | Lecture 4. Models of information systems.<br>Analysis and synthesis of information<br>systems.                                   | LO 3     | ID 3.1.     | 1              | 4  | QS 4 | Lecture No. 4<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|   | Lab 4. Comparison of data presentation in various formats.   | LO 1     | ID 1.1.     |                | 7  | ТК 4 | Task record №<br>4<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule      |
|   | Deadline Satu  | rday 12. | 00 pm QS 4, | TK 4           |    | 1    |   |
| 5 | Lecture 5. Basic concepts related to<br>information. Entropy. Redundancy of<br>information.                                      | LO 4     | ID 4.1.     |                | 4  | QS 5 | Lecture No. 5<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|   | Lab 5. Calculation of entropy, redundancy information.   | LO 1     | ID 1.1.     |                | 7  | ТК 5 | Task record №<br>5<br>(asynchronous<br>ly), link in the                                   |

|   |   |           |                 |           |      |      | Univer system schedule  |
|---|---|-----------|-----------------|-----------|------|------|---|
|   | IWSP 2 Consultation on the implementation of IWS2   | LO 1      | ID 1.1.         |           |      |      |   |
|   | <b>IWS 2</b> Solving individual tasks.  | LO 4      | ID 4.1.         |           | 25   | IT 2 |   |
|   | Deadline Satu   | rday 12.  | .00 pm QS 5     | , TK 5,   | IT 2 |      |   |
|   | MT 1  | LO 1      | ID 1.1.         |           | 100  |      |   |
|   | Module 2 Theoretical  | Foundatio | ons of Software | e Enginee | ring | -    |   |
| 6 | Lecture 6. Databases - a repository of information system information.<br>Relational database management.                           | LO 1      | ID 1.1.         | 2         | 4    | QS 6 | Lecture No. 6<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system                   |
|   | Lab 6. Display information on the screen.<br>Analysis and comparison of modern<br>modes of displaying information on the<br>screen. | LO 1      | ID 1.1.         | 1         | 7    | TK 6 | <ul> <li>Task record №</li> <li>6</li> <li>(asynchronous ly), link in the Univer system schedule</li> </ul> |
|   | Deadline Satu   | rday 12   | .00 pm QS 6     | , TK 6    | -    |      |   |
| 7 | Lecture 7. Technology work with information. Database views and stored procedures.  | LO 1      | ID 1.1.         |           | 4    | QS 7 | Lecture No. 7<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system                   |
|   | Lab 7. Exploring Information<br>Compression Techniques  | LO 4      | ID 4.1.         | 1         | 7    | TK 7 | Task record №<br>7<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule                        |
|   | Deadline Satu   | rday 12   | .00 pm QS 7     | , TK 7    |      |      |   |
| 8 | <b>Lecture 8.</b> Information processes are the basis of information systems.   | LO 1      | ID 1.1.         | 2         | 4    | QS 8 | Lecture No. 8<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system                   |
|   | Lab 8. The study of robust coding.  | LO 1      | ID 1.1.         |           | 7    | TK 8 | Task record №<br>8<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule                        |
|   | IWSP 3 Consultation on the implementation of<br>IWS3  | LO 1      | ID 1.1.         |           |      |      |   |
|   | IWS 3 Test.   | LO 1      | ID 1.1.         |           | 20   | IT 3 |   |
|   | Deadline Saturda  | ay 12.00  | pm QS 8, T      | K 8, IT   | 3    |      |   |

| 9  | Lecture 9. Models of the transfer process.  | LO 1        | ID 1.1.            |                    | 4      | QS 9  | Lecture No. 9<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer               |
|----|---|-------------|--------------------|--------------------|--------|-------|---|
|    | Lab 9. The study of file systems.   | LO 1        | ID 1.1.            | 2                  | 7      | ТК 9  | Task record №<br>9<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule          |
| 10 | Deadline Satu   |             | <u>v pm QS 9, </u> |                    | 4      | 05.10 | Lootuno No  |
| 10 | Lecture 10. Structures, storage facilities<br>and access methods. Data processing<br>systems  |             | ID 1.1.            | 2                  | 4      | QS 10 | 10<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system                |
|    | Lab 10. Exploring the logical structure of the hard disk  | LO 1        | ID 1.1.            |                    | 7      | TK 10 | Task record №<br>10<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule         |
|    | <b>IWSP 4</b> Consultation on the implementation of <b>IWS4</b>   | LO 1        | ID 1.1.            |                    |        |       |   |
|    | <b>IWS 4</b> Execution of individual assignment. (Report).  | LO 1        | ID 1.1.            |                    | 25     | IT 4  |   |
|    | Deadline Saturd   | ay 12.00    | pm QS 10, T        | <sup>с</sup> К 10, | IT 4-5 | 1     |   |
|    | MT 2  | LO 1        | ID 1.1.            |                    | 100    |       |   |
|    | Module 3 Organizationa  | l Foundatio | ons of Software    | Engine             | ering  | ·     |   |
| 11 | <b>Lecture 11</b> . Control of information transfer.  | LO 1        | ID 1.1.            |                    | 4      | QS 11 | Lecture No.<br>11<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|    | Lab 11. Information transfer rate,<br>communication channel capacity.   | LO 1        | ID 1.1.            | 1                  | 7      | TK 11 | Task record №<br>11<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule         |
|    | Deadline Satur  | day 12.00   | ) pm QS 11, '      | FK 11              | [      |       |   |
| 12 | Lecture 12. Systems applications:<br>management systems, executive and<br>operational support (DSS, ESS).<br>Enterprise Management Information<br>System (ERP, SCM, CRM). | LO 1        | ID 1.1.            | 1                  | 4      | QS 12 | Lecture No.<br>12<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer           |

|    |  |           |               |              |    |       | system  |
|----|--|-----------|---------------|--------------|----|-------|---|
|    | Lab 12. Relational databases. Data<br>normalization. Data redundancy. Normal   | LO 1      | ID 1.1.       | 1            | 7  | TK 12 | Task record №<br>12<br>(asynchronous  |
|    | iorms.   |           |               |              |    |       | ly), link in the<br>Univer system   |
|    | IWSP 6 Consultation on the implementation of<br>IWS5   | LO 1      | ID 1.1.       |              |    |       |   |
|    | <b>IWS 5</b> Execution of individual assignment. (Report).   | LO 1      | ID 1.1.       |              | 20 | IT 5  |   |
|    | Deadline Saturday  | 12.00 pr  | n QS 12, TK   | 12, IT       | 5  |       |   |
| 13 | <b>Lecture 13.</b> A single information space as the basis for building modern information systems. OLAP technology, OLTP. | LO 1      | ID 1.1.       | 1            | 4  | QS 13 | Lecture No.<br>13<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|    | Lab 13. Relational database management.<br>SQL language.   | LO 1      | ID 1.1.       | 1            | 7  | TK 13 | Task record №<br>13<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule         |
|    | Deadline Satur   | day 12.00 | ) pm QS 13, 7 | <b>FK 13</b> |    | 1     |   |
| 14 | <b>Lecture 14.</b> Security of information systems. Ethics and crime.  | LO 1      | ID 1.1.       | 1            | 4  | QS 14 | Lecture No.<br>14<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|    | Lab 14. CASE -technology to describe the projected IS.   | LO 1      | ID 1.1.       | 1            | 7  | TK 14 | Task record №<br>14<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule         |
|    | Deadline Satur   | day 12.00 | ) pm QS 14, 7 | <b>FK 14</b> |    | ſ     |   |
| 15 | Lecture 15 Modern directions of development of information systems.  | LO 1      | ID 1.1.       | 1            | 4  | QS 15 | Lecture No.<br>15<br>(synchronousl<br>y), link in the<br>timetable of<br>the Univer<br>system |
|    | Lab 15 Description of the system using various approaches.   | LO 1      | ID 1.1.       | 1            | 7  | TK 15 | Task record №<br>15<br>(asynchronous<br>ly), link in the<br>Univer system<br>schedule         |
|    | IWSP 6 Consultation on the implementation of IWS6  | LO 5      | ID 5.1.       |              |    |       |   |
|    | <b>IWS 6</b> Execution of individual assignment. (Report).   | LO 1      | ID 1.1.       |              | 25 | IT 6  |   |

## Deadline Saturday 12.00 pm QS 15, TK 15, IT 6

| MT 3                                   | LO 1 | ID 1.1. | 100 |  |
|--|------|---------|-----|--|
| Exam (The final result of the project) | LO 1 | ID 1.1. | 100 |  |

[Abbreviations: QS - questions for self-examination; TK - typical tasks; IT - individual tasks; CW - control work; MT - midterm.

Comments:

- Form of L and PT: webinar in MS Teams / Zoom (presentation of video materials for 10-15 minutes, then its discussion / consolidation in the form of a discussion / problem solving / ...)

- Form of carrying out the CW: webinar (at the end of the course, the students pass screenshots of the work to the monitor, he/she sends them to the teacher) / test in the Moodle DLS.

- All course materials (L, QS, TK, IT, etc.) see here (see Literature and Resources, p. 6).

- Tasks for the next week open after each deadline.

- CW assignments are given by the teacher at the beginning of the webinar.]

| Urmashev B.A.      |
|--------------------|
| Gusmanova F.R.     |
| Musiralieva Sh.Zh. |
| Bakibayev A.V.     |
|                    |