

SYLLABUS
Fall semester 2020-2021 academic years
on the educational program “8D06104-Mathematical and Computer Modeling”

Discipline's code	Discipline's title	Independent work of students (IWS)	No. of hours per week			Number of credits	Independent work of student with teacher (IWST)
			Lectures (L)	Practical training (PT)	Laboratory (Lab)		
	SCIENTIFIC RESEARCH METHODS	98	15	15	-	5	7
Academic course information							
Form of education	Type of course	Types of lectures		Types of practical training	Number of IWS	Form of final control	
online	theoretical	analytical		Task solution	6	writing	
Lecturer	Abdibekov Ualikhan Seidildaevich				Scheduled		
e-mail	uali@kaznu.kz						
Telephone number	2211589						
Academic presentation of the course							
Aim of course	Expected Learning Outcomes (LO)			Indicators of LO achievement (ID)			
	As a result of studying the discipline the undergraduate will be able to:						
	LO 1. Constructing Hypotheses			ID.1.1 The definition of a hypothesis. The functions of a hypothesis ID.1.2 The testing of a hypothesis. The characteristics of a hypothesis			
	LO 2. Developing a conceptual framework			ID. 2.1 The concept of sampling. Definitions of sampling terminology. Principles of sampling ID2.2 Random/probability sampling designs			
	LO 3. Establishing the Validity and Reliability of a Research Instrument			ID.3.1 The concept of validity. Different types of validity in quantitative research ID. 3.2 The concept of reliability. Factors affecting the reliability of			

		a research instrument
	LO 4. Research Methodology and Practice Evaluation	ID. 4.1 Types of evaluation from a focus perspective ID.4.2Types of evaluation from a philosophical perspective
	As a result of studying the discipline, the doctoral candidate will be able to independently understand scientific articles and independently build models for turbulent flow	
Prerequisites	Mathematical and computer modeling of physical process, continuum mechanics, mechanic of fluid, computational fluid dynamic	
Post requisites		
Information resources	<p>literature:</p> <ol style="list-style-type: none"> 1. G. Brar.,V.K.Jain, A.Singh .Research Methodology//International Journal of Humanities Social Sciences and Education (IJHSSE) Volume 1, Issue 8, August 2014, PP 63-67 ISSN 2349-0373 (Print) & ISSN 2349-0381 (Online) www.arcjournals.com. P.63-67 2. C. Williams. Research Methods// Journal of Business & Economic Research – March 2007 Volume 5, Number 3, p.65-71 3. Introduction to Scientific Research. 27 p. 4. R.Kumar. RESEARCH METHODOLOGY a step-by-step guide for beginners. SAGA, London EC1Y 1SP, 366 p. 5. S. MacDonald, N. Headlam Research Methods Handbook GLES, Express Networks, Manchester M4 5DL, 37 p. <p>Internet-resources: Additional educational material, lecture and practical classes, CDS assignments are uploaded to the teaching materials section of the univ.kaznu.kz website.</p>	
Academic policy of the course in the context of university moral	<p>Academic Behavior Rules: 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. 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.</p> <p>Academic values:</p> <ul style="list-style-type: none"> - Practical trainings/laboratories, IWS should be independent, creative. - Plagiarism, forgery, cheating at all stages of control are unacceptable. 	

and ethical values	- Students with disabilities can receive counseling at e-mail uali@kaznu.kz
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:

Week / date	Topic title (lectures, practical classes, Independent work of students, IWS)	LO	ID	Number of hours	Maximum score	Form of Knowledge Assessment	The Form of the lesson / platform
Module 1. Constructing Hypotheses							
1	Lecture 1. Deciding what to research. The formulation of research objectives	LO.1	ID.1.1- ID.1.2	1			Video lecture in MS Teams
	Practical class 1. Related exercises	LO.1	ID.1.1- ID.1.2	1	10	writing	
2	Lecture 2. Formulating a research problem in qualitative research Identifying Variables	LO.1-	ID.1.1- ID.1.2	1			Video lecture in MS Teams
	Practical class 2. Related exercises	LO.1	ID.1.1- ID.1.2	1	10	writing	Webinar in MS Teams
3	Lecture 3. The definition of a hypothesis. The functions of a hypothesis. The testing of a hypothesis. The characteristics of a	LO.1	ID.1.1- ID.1.2	1			Video lecture in MS

	hypothesis						Teams
	Practical class 3. Related exercises	LO.1	ID.1.1- ID.1.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.				20	writing	
4	Lecture 4. Types of hypothesis. Errors in testing a hypothesis. What is a research design?	LO.1	ID.1.1- ID.1.2	1			Video lecture in MS Teams
	Practical class 4. Related exercises	LO.1	ID.1.1- ID.1.2	1	10	writing	Webinar in MS Teams
5	Lecture 5. The functions of a research design. The theory of causality and the research design	LO.1	ID.1.1- ID.1.2	1			Video lecture in MS Teams
	Practical class 5. Related exercises	LO.1	ID.1.1- ID.1.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.				30	writing	
	MT 1				100	writing	
Module 2. Developing a conceptual framework							
6	Lecture 6. Study designs based on the number of contacts (cross- sectional studies; before-and-after studies;longitudinal studies).Study designs based on the reference period (retrospective; prospective; retrospective–prospective)	LO.2	ID.2.1- ID.2.2	1			Video lecture in MS Teams
	Practical class 6. Related exercises	LO.2	ID.2.1- ID.2.2	1	10	writing	Webinar in MS Teams
7	Lecture 7. Study designs based on the nature of the	LO.2	ID.2.1- ID.2.2	1			Video lecture

	investigation(experimental; non-experimental; quasi- or semi-experimental).Study designs in qualitative research(Case study; Focus groups/group interviews; Participant observation; Oral history)						in MS Teams
	Practical class 7. Related exercises	LO.2	ID.2.1-ID.2.2	1	10	writing	Webinar in MS Teams
8	Lecture 8. Collecting data using primary sources: Observation. Collecting data using primary sources: The interview;	LO.2	ID.2.1-ID.2.2	1			Video lecture in MS Teams
	Practical class 8. Related exercises.	LO.2	ID.2.1-ID.2.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.				20	writing	
9	Lecture 9. Collecting data using primary sources: The questionnaire. The concept of sampling. Definitions of sampling terminology. Principles of sampling	LO.2	ID.2.1-ID.2.2	1			Video lecture in MS Teams
	Practical class 9. Related exercises	LO.2	ID.2.1-ID.2.2	1	10	writing	Webinar in MS Teams
10	Lecture 10. Random/probability sampling designs.Non-random/non-probability sampling designs in quantitative research	LO.2	ID.2.1-ID.2.2	1			Video lecture in MS Teams
	Practical class 10. Related exercises	LO.2	ID.2.1-ID.2.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.				30	writing	
	MT (Midterm Exam)				100	writing	
Module 3. Research Methodology and Practice Evaluation							

11	Lecture 11. Ethics: the concept. Stakeholders in research. Ethical issues to consider concerning research participants	LO.3- LO.4	ID.3.1- ID.4.2	1			Video lecture in MS Teams
	Practical class 11. Related exercises	LO.3- LO.4	ID.3.1- ID.4.2	1	10	writing	Webinar in MS Teams
12	Lecture 12. Ethical issues to consider relating to the researcher. Ethical issues to consider regarding the sponsoring organization. The concept of validity. Different types of validity in quantitative research	LO.3- LO.4	ID.3.1- ID.4.2	1			Video lecture in MS Teams
	Practical class 12. Related exercises	LO.3- LO.4	ID.3.1- ID.4.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.				20	writing	
13	Lecture 13. The concept of reliability. Factors affecting the reliability of a research instrument. Methods of determining the reliability of an instrument in quantitative research. Validity and reliability in qualitative research. What evaluation is and why it is done	LO.3- LO.4	ID.3.1- ID.4.2	1			Video lecture in MS Teams
	Practical class 13. Related exercises	LO.3- LO.4	ID.3.1- ID.4.2	1	10	writing	Webinar in MS Teams
14	Lecture 14. The process for using evaluation to develop an intervention. The two different perspectives in the classification of evaluation studies. Types of evaluation from a focus perspective	LO.3- LO.4	ID.3.1- ID.4.2	1			Video lecture in MS Teams
	Practical class 14. Related exercises	LO.3- LO.4	ID.3.1- ID.4.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.	LO.3- LO.4	ID.3.1- ID.4.2		15	writing	
15	Lecture 15. Types of evaluation from a philosophical perspective. The process of undertaking an evaluation. The importance of involving stakeholders in evaluation	LO.3- LO.4	ID.3.1- ID.4.2	1			Video lecture in MS Teams

	Practical class 15. Related exercises	LO.3- LO.4	ID.3.1- ID.4.2	1	10	writing	Webinar in MS Teams
	Independent work of student with teacher: IWST.				15	writing	Webinar in MS Teams
	MT 2				100	writing	
	Exam				100	writing	

[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.]

Dean

Chairman of the Faculty Methodical Bureau

Head of the Department



Lecturer