**Faculty of Mechanics and Mathematics**

**Department Mathematical Modelling and Simulation**

**PROGRAM of "SCIENTIFIC RESEARCH METHODS"**

 **Final exam**

**for the specialty "­­­­ 8D06104-Mathematical Modelling and Simulation "**

**(fall semester, 2021/2022)**

**Almaty 2021**

**DEVELOPED:**

**ABDIBEKOV UALIKHAN CEIDILDAEVICH - professor**

PROGRAM of SUBJECT

1. Deciding what to research
2. The formulation of research objectives
3. Formulating a research problem in qualitative research
4. Identifying Variables
5. The definition of a hypothesis. The functions of a hypothesis
6. The testing of a hypothesis. The characteristics of a hypothesis
7. Types of hypothesis. Errors in testing a hypothesis
8. What is a research design?
9. The functions of a research design
10. The theory of causality and the research design
11. Study designs based on the number of contacts (cross-sectional studies; before-and-after studies;longitudinal studies)
12. Study designs based on the reference period (retrospective; prospective; retrospective–prospective)
13. Study designs based on the nature of the investigation(experimental; non-experimental; quasi- or semi-experimental)
14. Study designs in qualitative research(Case study; Focus groups/group interviews; Participant observation; Oral history)
15. Collecting data using primary sources: Observation
16. Collecting data using primary sources: The interview;
17. Collecting data using primary sources: The questionnaire
18. The concept of sampling. Definitions of sampling terminology. Principles of sampling
19. Random/probability sampling designs
20. Non-random/non-probability sampling designs in quantitative research
21. Ethics: the concept. Stakeholders in research
22. Ethical issues to consider concerning research participants
23. Ethical issues to consider relating to the researcher. Ethical issues to consider regarding the sponsoring organisation
24. The concept of validity. Different types of validity in quantitative research
25. The concept of reliability. Factors affecting the reliability of a research instrument
26. Methods of determining the reliability of an instrument in quantitative research. Validity and reliability in qualitative research
27. What evaluation is and why it is done
28. The process for using evaluation to develop an intervention. The two different perspectives in the classification of evaluation studies
29. Types of evaluation from a focus perspective
30. Types of evaluation from a philosophical perspective
31. The process of undertaking an evaluation
32. The importance of involving stakeholders in evaluation
33. RESEARCH METHODOLOGY a step-by-step guide for beginners Ranjit Kumar

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1. SOCIAL SCIENCE RESEARCH: PRINCIPLES, METHODS, AND PRACTICES Anol Bhattacherjee, Ph.D. University of South Florida Tampa, Florida, USA abhatt@usf.edu

**CONSIDERED and APPROVED**

**at the meeting of the department from " " 2021, protocol №**