

Министерство образования Республики Беларусь  
 Учреждение образования  
 «Гродненский государственный университет  
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APPROVED

«\_01\_» February 2021 y.

Chairman

of the Admissions Committee

Rector of Yanka Kupala State

University of Grodno

I. Kiturka

## THE LIST OF TOPICS OF EDUCATIONAL DISCIPLINES

for an additional interview with applicants

from among foreign citizens and stateless persons,

temporarily staying or temporarily residing in the Republic of Belarus,

for obtaining second stage of higher education in the specialty

**1-40 80 03 «Computer ingeneering» (profilisation «Programmable complexes, systems and services»)**

(English language of tuition)

Name of the educational discipline	The list of topics of the educational discipline
Organization and functioning of computer systems	Structural diagram of a personal computer. Processors. Motherboards. Means of long-term data storage. Auxiliary devices. General architectural properties and principles.
Object-oriented programming technologies and design standards	Five Attributes of a Complex System. Object-oriented design principles: abstraction, encapsulation, decomposition, generalization. Objects and Classes. Inheritance. Polymorphism. Class hierarchy. Multiple inheritance. Relationships between the objects: association, aggregation, composition.  SOLID design principles: Single-responsibility principle, Open-Closed Principle, Liskov substitution principle, Interface segregation principle, Dependency Inversion principle.
Database	Concept of Databases. Levels of system with database. Concept of data model. Infological (conceptual) model. Implementation model. The main models of databases.  Conceptual data modelling. Logical and physical data models and their representation tools. Diagram “Entity-Relationship” (ER-diagrams). The main concept ER-diagrams, kinds of entities and relationships, display different restrictions.  Features of relational data model. The main concept relational data model: relation, record, domain, relationships.  SQL command types and their purpose. DDL – data definition language. DML – data manipulation language. DQL – data query language. DCL – data control language; commands of data administration; command of manage to transaction.  Database security. Concept of security. The goal of database security.