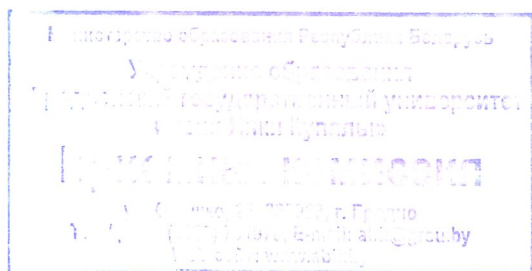


Education institution stamp



APPROVED

«05» 01 2026 y.

Chairman

of the Admissions Committee,
Rector of Yanka Kupala State
University of Grodno

I. Kiturka
(signature)

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 advanced higher education in the specialty
7-06-0611-05 «Computer engineering»
(English language of tuition)

Name of the educational discipline	The list of topics of the educational discipline
Algorithms and Data Structures	Algorithm complexity: worst-case, best-case, average-case. Simple data structures: array, list, stack, queue. Tree as a data structure. Tree traversal algorithms. Binary Trees. Graph as a data structure. Types of Graphs. Representation of Graph data structure. Graph Algorithms: Breadth First Traversal, Depth First Traversal, Dijkstra's shortest path algorithm, Floyd Warshall Algorithm.
Object-oriented programming technologies and design standards	Basic OOP principles: abstraction, encapsulation, inheritance, polymorphism. Types of relation between classes in Object Oriented Programming: association, aggregation, composition. SOLID design principles: Single-responsibility principle, Open-Closed Principle, Liskov substitution principle, Interface segregation principle, Dependency Inversion principle. Design patterns. Creational Patterns. Structural Patterns. Behavioral patterns.
Database	Concept of Databases. Concept of data model. Infological (conceptual) model. Implementation model. Logical and physical data models and their representation. Relational data model. Relational database. Database normalization: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF). SQL as language to manage data. Basic SQL commands and their purpose.
Web application development	Web Application Architecture: Single Page Application, Multi-Page Application, Microservices, Progressive Web Apps, Serverless Architecture. Transfer protocols HTTP/HTTPS. HTTP methods: GET, POST, PUT, HEAD, DELETE, PATCH. Client Side Technologies: HTML, CSS, JavaScript, frontend frameworks. Server Side Technologies: Java, PHP, ASP.NET, REST API.