Ministry of Science and Higher Education of the Russian Federation federal state autonomous educational institution of higher education "Peter the Great St. Petersburg Polytechnic University"

# Institute of Industrial Management, Economics and Trade

# APPROVED

Director of the Institute of Industrial Management, Economics and Trade

V.E. Schepinin exmedie 2024

# PROGRAM

of the admission exam for the applicants to master's program in the field of study / educational program 38.04.05 "Business Informatics" 38.04.05\_02 Business Engineering

Code and name of the field of study / educational program

St. Petersburg 2024

#### ABSTRACT

The program includes a list of topics (questions) on subject of the basic part of the professional block in the field 38.03.05 "Business Informatics", which are included in the content of the admission exam for the master's program.

The admission exam is evaluated on a 100-point scale and consists of three blocks:

- Business Process Modeling;

- Information Systems Life Cycle Management;

- Project Management.

Head of educational program
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The program was reviewed and recommended for publication by the Methodological Council of **Institute of Industrial Management, Economics and Trade** (protocol No. 3 dated 16.10.2024)

# 1. DISCIPLINES INCLUDED IN THE INTERDISCIPLINARY EXAMINATION PROGRAM

- 1.1. Business Process Modeling;
- 1.2. Information Systems Life Cycle Management;
- 1.3. Project Management.

# 2. CONTENT OF ACADEMIC DISCIPLINES

#### **2.1. Business Process Modeling**

Topics (questions):

- 1. Advantages of the process approach to managing an organization
- 2. Basic definitions of the process approach.
- 3. Function-oriented and process-oriented organizations.
- 4. The concept of a business process.
- 5. Process approach and process management cycles.
- 6. Theoretical foundations of process management
- 7. Systematic approach. Organization as a system. Subsystems of the organization.
- 8. Structural analysis.
- 9. Concept of Business Process Management. Life cycle of process management in BPM.
- 10. Process and its components.
- 11. Properties of processes.
- 12. Classification of processes.
- 13. The concept of modeling activities and modeling business processes of an organization.
- 14. General principles of modeling.
- 15. The concept of business process modeling methodology.
- 16. Classification of methodologies.
- 17. Concepts of model, model object and connection.
- 18. Use of standard and reference models.
- 19. Selection of methodology and instrumental system for modeling business processes.
- 20. IDEF methodology.
- 21. Objects and connections in IDEF0.
- 22. Rules for the design of diagrams.
- 23. Purpose of the IDEF3 methodology.
- 24. Purpose of DFD methodology.
- 25. ARIS methodology.
- 26. Main types of models and notations in the ARIS methodology.
- 27. BPMN methodology.
- 28. Models of strategic planning. BSC method.
- 29. Event Process Chain (EPC).
- 30. Description of the organizational structure.

Study Literature:

1. Body of knowledge on business process management BPM CBOK 4.0. Alpina Publisher, Moscow. 2022.

- 2. V.G. Eliferov, V.V. Repin. Business processes. Regulation and management // Institute of Economics and Finance "Synergy", 2021.
- 3. <u>http://www.aris-portal.ru</u>– website dedicated to the ARIS methodology.
- 4. <u>http://www.idef.ru</u>- website dedicated to the IDEF methodology.
- 5. <u>http://www.bpmn.org/</u>- a site dedicated to the BPMN methodology.

# 2.2. Information Systems Life Cycle Management

Topics (questions):

- 1. Information needs of the enterprise.
- 2. Definition of information process, information technology, information system.
- 3. Basic concepts of information systems.
- 4. Characteristics of information systems.
- 5. Properties of information processes, systems and networks.
- 6. Information transmission and processing systems.
- 7. Economic automated information systems.
- 8. Classes of information systems design technologies.
- 9. Life cycle models of information systems.
- 10. Development of an information system in accordance with the requirements
- 11. GOST 34. Stages and stages of development.
- 12. Tools for computer-aided design of information systems.
- 13. Methodologies for modeling the subject area. Development of functional models in toplevel notations (DFD).
- 14. Methodologies for modeling the subject area. Modeling work flows using low-level notations (WFD).
- 15. Modeling of IS information support. Rules for constructing ER diagrams.
- 16. Stages of the life cycle of information systems.
- 17. Standard and original IC design.
- 18. Basics of the RUP methodology.
- 19. Corporate methodologies for implementing IS (methodologies for introducing standard IT solutions from Microsoft, SAP SE, 1C).
- 20. Characteristics of IT services.
- 21. Basic ITIL/ITSM processes.
- 22. Basics of building corporate information systems.
- 23. Principles of building corporate information systems.
- 24. Goals and objectives of corporate information systems.
- 25. General overview of ERP systems.
- 26. Generation of ERP systems: overview of functionality, role in increasing enterprise management efficiency.
- 27. Review of CRM, SCM and PLM systems.
- 28. Electronic document management systems.
- 29. Internet services.
- 30. Enterprise architecture structure.

Study Literature:

- 1. Kosinenko N.S. Information systems and technologies in economics [Electronic resource]: textbook / Kosinenko N.S., Friesen I.G.—Electron. text data. Moscow: Dashkov and K, IP Er Media, 2017. 304 p.
- 2. Information technologies in economics and management: textbook for academic bachelor's degree / V.V. Trofimov [etc.]; under Edited by V.V. Trofimov. 2nd ed., revised. and additional Moscow: Yurayt Publishing House, 2018. 482 p.

- Sovetov, B.Ya. Information technology: a textbook for applied bachelor's degree / B. Ya. Sovetov, V. V. Tsekhanovsky. - 7<sup>th</sup> ed., revised and additional - Moscow: Yurayt Publishing House, 2019. - 327 p.
- 4. Izbachkov Yu.S. Information systems: Textbook for universities / Yu.S. Izbachkov, V.N. Petrov. 3rd ed. St. Petersburg: Peter, 2011. 544 p.

#### 2.3. Project Management

Topics (questions):

- 1. Basic terms and definitions.
- 2. 2. Evolution of project management systems.
- 3. Project charter.
- 4. Project life cycle.
- 5. Participants and structure of the project.
- 6. Analysis of stakeholders in the project.
- 7. Project phases.
- 8. Project milestones.
- 9. Completion of the project.
- 10. Project cost management.
- 11. Risk management in the project.
- 12. Project change management.
- 13. Quality management in the project.
- 14. Project management standards.
- 15. Main roles in the IT project.
- 16. Project networks.
- 17. Project management office.
- 18. Multi-criteria choice of IS.
- 19. Project portfolio management.
- 20. Pattern technique.
- 21. Automated project management systems.
- 22. Cascade model of software development.
- 23. V-shaped software development model.
- 24. Incremental software development model.
- 25. Iterative model of software development.
- 26. Spiral model of software development.
- 27. Agile principles.
- 28. Lean approach.
- 29. Scrum methodology.
- 30. Features of PRINCE2.

#### Study Literature:

- 1. Ilyin I.V. and others. Project management: St. Petersburg: POLYTECH-PRESS, 2021.
- 2. Matveeva L., Nikitaeva A. IT project management. Litres, 2022.
- 3. Kozhina A. V. Features of IT project management // Education and science without borders: social and humanitarian sciences. 2016. No. 4. P. 84.

# 3. CRITERIA FOR EVALUATING THE ADMISSION EXAM (INTERDISCIPLINARY EXAMINATION) FOR MASTER'S PROGRAM 38.04.05\_02 BUSINESS ENGINEERING

The test is a set of test tasks reflecting questions on the main sections of three disciplines presented in the Program of entrance examinations to the master's program in the field of "Business Informatics":

- Business Process Modeling 40 points;
- Information Systems Life Cycle Management 40 points;
- Project Management 20 points.

Test tasks are completed without the use of auxiliary educational materials, in written form.

# Types of test items.

According to the method of answering, test tasks can be of the following main types:

- closed tests with one correct answer, in which you need to choose only one correct answer from the proposed options;
- closed tests with two or more correct answers, in which at least two correct answers must be marked from the proposed options;
- open tests in which there are no correct answer options; the applicant must give the only correct answer independently.

# Test questions will be divided into three blocks.

# Block 1. Discipline «Business Process Modeling».

Number of test questions -10, including:

- closed test tasks 9;
- open test tasks 1.

# Block 2. Discipline «Information Systems Life Cycle Management».

Number of test questions – 10, including:

- closed test tasks -9;
- open test tasks -1.

# Block 3. Discipline «Project Management».

Number of test questions – 10, including:

- closed test tasks -9;
- open test tasks -1.

Evaluation criteria (see table 1).

# Block 1. Discipline «Business Process Modeling» (40 points).

For each correctly solved **closed test task** with one correct answer, **4 points** are assigned.

For each correctly solved **closed test task** with more than one correct answer, provided that all correct answers are selected, **4 points** are assigned.

If in a closed test task with **two or more correct answers** the applicant did not mark all correct answer options, **2 points** are assigned for the test task.

For each correctly solved open test task, 4 points are assigned.

#### Block 2. Discipline «Information Systems Life Cycle Management» (40 points).

For each correctly solved **closed test task** with one correct answer, **4 points** are assigned. For each correctly solved **closed test task** with more than one correct answer, provided that all correct answers are selected, **4 points** are assigned.

If in a closed test task with **two or more correct answers** the applicant did not mark all correct answer options, **2 points** are assigned for the test task.

For each correctly solved open test task, 4 points are assigned.

#### Block 3. Discipline «Project Management» (20 points).

For each correctly solved **closed test task** with one correct answer, **2 points** are assigned. For each correctly solved **closed test task** with more than one correct answer, provided that all correct answers are selected, **2 points** are assigned.

If in a closed test task with **two or more correct answers** the applicant did not mark all correct answer options, **1 point** are assigned for the test task.

For each correctly solved open test task, 2 points are assigned.

#### The total score is 100 points.

If in an open test, despite the solution algorithm provided by the applicant, there is no final and only correct answer, no points are awarded for the test task.

If all answer options in a test task are marked as correct, no points are awarded for the test task.

The points assigned for the tasks are presented in Table 1.

# Table 1

	Closed test task				Open test task		TOTAL	
							Number	
	Number		Number		Number		of	
Discipline	of		of		of	Poin	question	Poin
	questions	Point	questions	Point	questions	t	S	t
Business								
Process								
Modeling	-	-	9	4	1	4	10	40
Information								
Systems Life								
Cycle								
Management	-	-	9	4	1	4	10	40
Project								
Management	9	2	-	-	1	2	10	20
			medium					
			difficulty					
Question type	simple que	estion	question					
							30	100

#### 4. EXAMPLE OF TEST TASK

#### Peter the Great St. Petersburg Polytechnic University Institute of Industrial Management, Economics and Trade

#### APPROVED

Head of educational program \_\_\_\_\_\_ Alexandra D. Borremans

«\_\_\_\_» \_\_\_\_ 2024

# ADMISSION EXAM in the field of study / educational program 38.04.05 "Business Informatics"

#### 38.04.05\_02 Business Engineering

Code and name of the field of study / educational program

#### **Block 1. Business Process Modeling**

- 1. What is BSC (Balanced Scorecard):
  - a. is a system of interconnected models of the company's business processes
  - b. is an approach to designing an enterprise management system that includes modeling goals, business processes, organizational structure and information systems
  - c. is an approach to enterprise management system design developed by Business Studio
  - d. is a system of strategic management of a company based on measuring and assessing its effectiveness using a set of optimally selected indicators
- 2. What is dominance on the IDEF0 model:
  - a. Blocks are placed on the diagram by degree of importance or order of execution
  - b. Priority when allocating resources
  - c. Sorting the block by cost volume
  - d. Sorting blocks by volume of allocated costs
- 3. Necessary or desired result of the process
  - a. the purpose of the business process
  - b. process boundaries
  - c. initiating event
  - d. final event
- 4. Business process regulations are...

#### **Block 2. Information Systems Life Cycle Management**

- 1. Basic information theories currently developed:
  - a. Syntactic theory
  - b. Pragmatic theory
  - c. Statistical theory
  - d. Economic theory

2. In the process of describing an organization during the design of corporate information

systems, it is necessary to build a system of models consisting of:

- a. Data Models
- b. Function Models
- c. Strategic development models
- d. Life cycle models
- e. Business models

3. A continuous process, starting from the moment the decision is made to create an information system and ending at the moment it is completely taken out of service:

- a. exploitation of IP
- b. IP life cycle
- c. IP development
- d. IC design

4. Specify the purpose and list the functionality of SCM systems: ...

#### **Block 3. Project Management**

1. Select a term for which a definition is given: "project team members involved in project management"

- a. Project investor
- b. Coordination Council
- c. Project management team
- d. The project team

2. Which of the following is not a type of project management organizational structure

- a. functional
- b. matrix
- c. strategic
- d. design

3. Which role is higher in the hierarchy of the management team - project manager or project supervisor in the PRINCE2 standard?

- a. Project curator
- b. Project manager
- c. On the same level
- d. Not on the team

4. The term for which a definition is given: "the owner of the project and the future consumer of its results" is....