

Name of the entrance exam
Intelligent Systems
Field/fields of study
09.04.01 Information Science and Computer Engineering
Educational program/programs
09.04.01_17 Intelligent Systems (International Educational Program)
Abstract
<p>The program of the interdisciplinary entrance exam for the Master's degree is based on general professional disciplines implemented in the educational program 09.03.01 "Information Science and Computer Engineering". The program contains a list of themes (questions) on disciplines, recommended literature for exam preparation and examples of test tasks.</p> <p>The entrance test is organized in the form of an interdisciplinary exam in accordance with the requirements of the Russian State Educational Standard of Higher Education. It is held face to face in written form or remotely. The results of the entrance test are evaluated in points. The maximum score is 100. The minimum score confirming its successful completion is established by the Admission Rules approved for the current academic year.</p> <p>The duration of the test is 90 minutes.</p> <p>During the entrance test, it is permitted to use writing utensils, scratch paper, and a calculator.</p>
Disciplines included in the program of entrance examinations for the Master's degree program
<ol style="list-style-type: none"> 1. Computer systems, networks and telecommunications 2. Operating systems 3. Computational Mathematics
Content of academic disciplines
<ol style="list-style-type: none"> 1. Computer systems, networks and telecommunications Themes of the discipline <ol style="list-style-type: none"> 1. Computer architecture. 2. Central processor unit. 3. Memory device. 4. The system bus, data bus, address bus. 5. Peripheral devices of the computer system. 6. Computer networks: principles and protocols. Recommended literature Broido V. L. and Ilyina O. P. Computer systems, networks and telecommunications: students book : Peter, 2011. 554 p. Orlov S. A. and Tsilker B. Ya. Organization of computers and systems : students book : St. Petersburg, 2011. 686 p. Kalinkina T. I., Kostrov B. V. and Ruchkin V. N. Telecommunication and computer networks. Architecture, standards and technologies : students book. St. Petersburg : BHV-Petersburg, 2010. 283 p. Khoroshevsky V. G.. Architecture of computer systems : students book. Publishing House of the Bauman Moscow State Technical University, 2008. 519 p. 2. Operating system Themes of the discipline Operating-System Structure: Operating-System Services, User and Operating-System Interface, System Calls, System Services, Linkers and Loaders. Process Concept: Process Scheduling, Operations on Processes, Interprocess Communication, IPC in Shared-Memory Systems, IPC in Message-Passing Systems. Threads & Concurrency: Multicore Programming. Multithreading Models. Thread Libraries. Implicit Threading. CPU Scheduling: Scheduling Criteria. Scheduling Algorithms. Thread Scheduling. Multi-Processor Scheduling. Real-Time CPU Scheduling. Synchronization Tools: The Critical-Section Problem. Peterson's Solution. Hardware Support for Synchronization. Mutex Locks. Semaphores. Monitors. Liveness. Deadlocks: Deadlock in Multithreaded Applications. Deadlock Characterization. Methods for Handling Deadlocks. Deadlock Prevention. Deadlock Avoidance. Deadlock Detection. Recovery from Deadlock. Main Memory: Contiguous Memory Allocation. Paging. Structure of the Page Table. Swapping. Recommended literature Karpov V. E., Konkov K. A. Fundamentals of operating systems. Course of lectures : students book. M. : Internet University of Information Technologies, 2011. 531 p. Petrov A. V., Fedorov S. A. System software GNU/Linux. Basics of the command line : students book; Peter the Great St. Petersburg Polytechnic University. St. Petersburg, 2023. Gordeev A. V. Operating systems : students book. Moscow : Piter, 2009. 415 p. Nazarov S. V. Modern operating systems : students book / S. V. Nazarov, A. I. Shirokov. M. Internet-University of Information Technologies, 2010 : Binom. Laboratory of knowledge. 279 p. Avi Silberschatz, Peter Baer Galvin, Greg Gagne. Operating System Concepts. Tenth Edition. John Wiley & Sons, Inc. ISBN 978-1-118-06333-0

3. Computational Mathematics

Themes of the discipline

Theoretical foundations of numerical methods (Computational errors. Stability and complexity of the algorithm (in memory, in time)).

Numerical methods of linear algebra.

Numerical methods for solving nonlinear equations and systems.

Interpolation of functions.

Numerical integration and differentiation.

Solution of ordinary differential equations.

Methods of approximation and approximation of functions.

Fourier transform.

Mathematical software systems (introduction to Matlab, MathCad, Maple).

Recommended literature

Zhidkov E. N. Computational mathematics : students book. M. Academy, 2010. 199 p.

Porshnev S. V. Computational mathematics : a course of lectures. Saint-Petersburg : BHV-Peterburg, 2014. 320 p.

Kalitkin N. N. Numerical methods : textbook for universities and universities. Saint-Petersburg : BHV-Peterburg, 2015. P 586 p.

Samarsky A. A., Mikhailov A. P. Mathematical modeling. Ideas. Methods. Examples. Moscow : Fizmatlit, 2005. 316 p.

Bakhvalov, N. S. Bakhvalov N. S. , Zhidkov N. P., Kobelkov G. M. Numerical methods. Ninth edition. Moscow : Laboratory of Knowledge, 2020. 636 p.

Entrance exam assessment criteria

Test consists of 25 questions. The maximum number of points for each question is 4.

Assigned group

Programme director E.S. Gebel

Authors of the Program:

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