

Discipline annotation**Discipline name / Дискретная математика / Discrete Mathematics****Summary**

Sets and their specifications, operations on sets, solving identities with sets, relations, operations on relations, properties and types of relations, functions and mappings, types of mappings. Basic concepts of graph theory, representation of graphs by machine descriptions, graph connectivity, definition of graph connectivity, routes and paths in a graph, definition of shortest paths in a graph, flows in graphs, coloring of a graph. Combinatorial problems, combinations, permutations, placements, methods for solving combinatorial problems, generating functions, algorithms for generating permutations. Methods for setting logical functions, laws and axioms of algebra of logic, canonical forms of representation of logical functions, methods for minimizing logical functions, synthesis of combinational circuits.

Learning outcomes of the discipline

- operates with elements of numerical fields, linear spaces, linear operators, matrices, vectors, linear and non-linear geometric objects; solves systems of linear equations; applies algebraic methods to solve geometric problems; applies algebraic and geometric methods to solve applied problems, as well as evaluates the quality of the solutions obtained; demonstrates the ability to abstract, including the ability to logically develop individual formal theories and establish a connection between them.

- able to use mathematical methods and software technologies for working with algebraic structures to solve professional tasks.

Workload, c. u.

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Reporting Forms

Graded test- 3rd semester

List of essential and supplementary literature necessary for mastering the discipline**Essential literature**

- 1) Berezhnoy, V. V. Discrete Mathematics / Electronic source: textbook / A. V. Shaposhnikov / V. V. Berezhnoy. - Stavropol: North Caucasus Federal University, 2016. - 199 p. - The book is in the basic version of IPRbooks ELS.
- 2) Novikov, F. A. Discrete mathematics: for bachelors and masters: a textbook for students of higher educational institutions studying in the training program "System Analysis and Management" / F. A. Novikov. - 2nd ed. - Moscow [and others]: Peter, 2014. - 400 p.: ill., tab. - (Textbook for universities). – On the front page and cover: Standard of the third generation. – Stamp: recommended by the Academic Methodological Association. - Bibliography: p. 386-387. – Subject index: p. 388-399. - ISBN 978-5-496-00015-4
- 3) Prosvetov, G. I. Discrete Mathematics: Problems and Solutions: Educational and Practical Guide / G. I. Prosvetov. - 2nd ed., enlarged. - Moscow: Alfa-Press, 2015. - 240 p.: ill. - Bibliography: p. 233-234. - ISBN 978-5-94280-419-0

Supplementary literature

- 1) Veretennikov, B. M. Discrete Mathematics / B. M. Veretennikov; V. I. Belousova, I. - Yekaterinburg: Ural University Press, 2014. - 132 p. - ISBN 978-5-7996-1199-6 | 978-5-7996-1195-8
- 2) Ivanov, B. N. Discrete Mathematics. Algorithms and programs: an extended course [from a real programmer]: study guide / B. N. Ivanov. - M.: Izvestia, 2011. - 512 p. - Bibliography: p. 501-502. - Subject index: p. 503-509. - ISBN 978-5-206-00824-1
- 3) Kulikov, V. V. Discrete Mathematics: study guide for universities / V. V. Kulikov. - Moscow: Rior, 2013. - 174 p.: ill.; 22. - (Higher education. Bachelor's degree). - Stamp: recommended by the Academic Methodological Association. - Bibliography: p. 171. - ISBN 978-5-369-00205-6

	4) Lipsky, V. Combinatorics for programmers / Transl. from Polish. V. A. Evstigneeva, O. A. Loginova / Ed. by A. P. Ershova. - M.: Mir, 1988. - 213 p. : ill. - ISBN 5-03000979-5
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