TOMSK POLYTECHNIC UNIVERSITY ТОМСКИЙ ПОЛИТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

Discrete Mathematics

Course Overview

Level of study	**Bachelor Degree**
Workload	**ECTS: 3** **Total Hours: 80** **Contact Hours:** • **Lectures: 36** • **Labs:** • **Seminars: 54**
Course Code	
Semester	**Winter**
Prerequisites	**No**
Course Objectives	1. **To learn the fundamental theory about graphs and Boolean functions (definitions, theorems and their proofs)** 2. **To study the basic algorithms of graph theory and their modifications** 3. **To study basic algorithms of Boolean function minimization and of system of Boolean function minimization** 4. **To know applications of graph theory and Boolean functions theory**
Learning Outcomes	1. **Knowledge of basic definitions and theoretical results of the graph theory and Boolean function theory** 2. **Knowledge of basic algorithms of graph theory and their implementation** 3. **Skills of implementing of basic graph algorithms Skills of Boolean function minimization and of system of Boolean function minimization** 4. **Skills of both oral and written scientific communications**
Syllabus	1. **Basics of graph theory** 2. **Connectivity and optimal paths** 3. **Euler graphs and Hamiltonian graphs** 4. **Planarity and coloring problem** 5. **Basics of Boolean functions theory** 6. **Shannon expansion and full normal forms** 7. **Disjunctive normal forms** 8. **Boolean function minimization** 9. **Partial Boolean functions and systems of Boolean functions**

Labs	
Projects	**Projects include implementing algorithms in a programming language, delivering lectures and seminars, writing reviews of scientific papers. Any other options can be considered.**
Assessment	**Exam**
Resources	**https://www.coursera.org** **http://www.graphtheory.com** **http://www.freebookcentre.net/Mathematics/Graph-Theory-Books.html** **http://www.download32.com/graph-theory-software.html** **https://sourceforge.net/projects/graphalg/**
Instructors	**Yulia B. Burkatovskaya** **http://portal.tpu.ru:7777/SHARED/t/TRACEY/English**