

# MATH 174

## Discrete Mathematics for Computer Science

### Section 001 - Spring 2016

**Meeting times:** TTh 2:50 - 4:05 PM at **Gambrell 152**.

**Instructor:** Dr **Peter G. Binev**

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**Office hours:** TTh 10:30 - 11:30 AM and 2:00 - 2:30 PM at [LeConte](#) 425 or by appointment.

**Text:** *Discrete Mathematics: An Introduction to Mathematical Reasoning* by Susanna S. Epp, Brief Edition, Brooks/Cole Cengage Learning, 2011. The course will cover the material considered in chapters 1, 2, 3, 4, 5, 6, 8, 9 and 10.

**Online Texts:** *Sorting and searching algorithms* by Thomas Niemann

<http://epaperpress.com/sortsearch/download/sortsearch.pdf> will be used for the preparation of the projects. See also <http://bigocheatsheet.com> and <http://www.sorting-algorithms.com>

**Description:** Induction, complexity, elementary counting, combinations and permutations, recursion and recurrence relations, graphs and trees; discussion of the design and analysis of algorithms—with emphasis on sorting and searching.

**Credits:** 3

**Prerequisites:** C or better in any 100-level MATH course or placement through either version of the Mathematics Placement Test: <http://assess.math.sc.edu/>

**Learning Outcomes:** Upon the successful completion of this course students will be able to:

- reason mathematically about basic structures such as numbers, sets, graphs, and trees;
- use mathematical and logical notation to define and formally reason about mathematical concepts such as sets, relations, and integers, and discrete structures like trees and graphs;
- formulate and interpret statements presented in Boolean logic; reformulate statements from common language to formal logic and apply truth tables to them;
- evaluate elementary mathematical arguments and identify fallacious reasoning;
- construct inductive hypothesis and carry out simple induction proofs;
- calculate the number of possible outcomes of elementary combinatorial processes such as permutations and combinations;
- identify and use basic algorithms for sorting and searching.

**Outline:** The detailed tentative schedule with the covered sections and the assigned homework will be posted on Blackboard. The following shows the approximate time allocated for each of the chapters (including reviews and examinations during the semester):

- Chapter 1 - 1 week;
- Chapter 2 - 1 week;
- Chapter 3 - 1 week;
- Chapter 4 - 1 week;
- Chapter 5 - 1.5 weeks;
- Chapter 6 - 1 week;
- Chapter 8 - 1 week;
- Chapter 9 - 1.5 weeks;
- Chapter 10 - 1 week;
- Sorting and Searching - 2 weeks;
- Reviews and Exams - 2 weeks.

**Cell Phones and Calculators:** All electronic devices, especially cell phones, *must be disabled* during the class. No calculators are allowed.

**ADA:** If you have special needs as addressed by the Americans with Disabilities Act and need any assistance, please notify the instructor immediately.

**Appointments:** There is no need to schedule an out-of-class appointment during the office hours. To schedule an appointment outside these periods, please, send e-mail to the instructor shortly describing the issue to be discussed and suggesting several time periods for the meeting.

**Attendance:** Regular class attendance is important. A grade penalty will be applied to any student missing three or more classes (10%) during the semester. The "10 percent rule" stated above applies to both excused and unexcused absences. Students who anticipate potential excessive absences due to participation in permissible events as described in the USC Academic Bulletin ([http://www.sc.edu/bulletin/ugrad/acadregs.html#class\\_atten\\_](http://www.sc.edu/bulletin/ugrad/acadregs.html#class_atten_)) should receive prior approval from the instructor to potentially avoid such penalty. Same rules apply for other potential cases of approved absences described in the Bulletin. Students should consult immediately with the instructor about the completion of the missed assignments. An incomplete grade "I" could be assigned if the student is unable to complete assigned work because of an unanticipated illness, accident, work-related responsibility, family hardship, or verified learning disability. In such a case, the student will have up to 12 months in which to complete the work before a permanent grade is recorded.

**Academic Dishonesty:** Cheating and plagiarism will not be allowed. You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment, and in additional disciplinary measures including referring you to the Office of Academic Integrity. The University of South Carolina has articulated its policy governing academic integrity and the students are encouraged to carefully review it: <http://www.housing.sc.edu/academicintegrity/violations.html>.

**Homework and Quizzes:** A few homework problems will be assigned each class. Be sure to solve and write these problems before the next class. No homework assignments will be collected or graded. There will be several ten-minute quizzes at the end of most of the classes on **two** problems similar to ones from the homework. Each problem will be graded 1 for a correct answer with a possible partial score of 0.5 in case of a technical mistake. The quiz grade will be formed as the best 15 scores out of (at least) 18 quizzes. There will be **no makeup quizzes**.

**Exams:** There will be two exams in a form of a test during the semester. The tentative dates of these exams are **February 18** and **March 31**. The problems on the tests will be similar to the ones from the homework and the discussions in class. There will be **no makeup exams**.

**Project:** Each student will prepare a project that describes particular algorithms for sorting and/or searching and analyzes their performance. The project assignments will be distributed on or before April 7 and have to be submitted no later than **April 19, 2016**.

**Final Exam:** The final exam in a form of a test will take place on **Thursday, April 28, 2016 at 12:30 PM**. The problems will be from the entire material covered in the course.

**Grading:** There are **two options** for determining the total score for the course: without a final, determined by the quiz grade (30%), Exam 1 (25%), Exam 2 (25%), and the project grade (20%); or with a final, determined by the quiz grade (25%), Exam 1 (15%), Exam 2 (15%), the project grade (20%), and the Final Exam (25%). The option not to take the Final Exam should be declared in writing during the last class on **April 21, 2016**. The letter grades will be assigned as follows: **A** for at least 90%; **B+** for at least 86%; **B** for at least 80%; **C+** for at least 76%; **C** for at least 70%; **D+** for at least 66%; **D** for at least 60%; **F** for less than 60%.