Title of Course: Discrete Structures  
CSC 230  
Spring 2012  
Class hours: 3  
Lab hours: 0  
Credits: 3

Course Description:

This course covers foundational materials for computer science. Topics include algorithm analysis, recursion, recurrence, advanced graph theory, trees, Boolean algebra, and modeling computation. Students will be expected to complete projects for each topic involving formal proof techniques, mathematical reasoning and/or programming.

Prerequisites: MAT 200 Intro Discrete Mathematics and CSC110 Computer Programming I

Student Learning Outcomes:

After completing this course, students will be able to:

- **Outcome:** Describe basic properties of each discrete structure  
  **Assessment:** Short essay questions in assignments and exams.
- **Outcome:** Apply formal proof techniques  
  **Assessment:** Proof questions in assignments and exam questions.
- **Outcome:** to solve problems in computer science using graphs and trees  
  **Assessment:** programming projects.
- **Outcome:** analyze algorithm complexity  
  **Assessment:** Exam questions.

General Education Outcomes and Assessment

- **Quantitative Skills** – Students will use quantitative skills and concepts and methods of mathematics to solve problems  
  **Assessment:** Use formulas and concepts of mathematics to solve problems in assignments.
- **Information and Technology Literacy** – Students will collect, evaluate and interpret information and effectively use information technologies  
  **Assessment:** Design and analyze the algorithms for software developing in assignments.

Required Text & Readings:

**Title:** Discrete Mathematics and Its Applications, 7th Edition  
**Author:** Kenneth H. Rosen  
**Pub:** McGraw-Hill  
**ISBN:** 978-0-07-3383095

Other Resources: Flash drives are recommended.

Use of Technology (if applicable):

Evaluation & Requirements of Students:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>40%</td>
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<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td>Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</tbody>
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Outline of Topics:

3 The Fundamentals: Algorithms, the Integers, and Matrices
3.1 Algorithms
3.2 The Growth of Functions
3.3 Complexity of Algorithms
3.4 The Integers and Division
3.5 Primes and Greatest Common Divisors
3.6 Integers and Algorithms
3.7 Applications of Number Theory
3.8 Matrices

4 Induction and Recursion
4.4 Recursive Algorithms
4.5 Program Correctness

7 Advanced Counting Techniques
7.1 Recurrence Relations
7.2 Solving Recurrence Relations
7.3 Divide-and-Conquer Relations
7.4 Generating Functions
7.5 Inclusion-Exclusion
7.6 Applications of Inclusion-Exclusion

9 Graphs
9.5 Euler and Hamilton Paths
9.6 Shortest Path Problems
9.7 Planar Graphs
9.8 Graph Coloring

10 Trees
10.1 Introduction to Trees
10.2 Applications of Trees
10.3 Tree Traversal
10.4 Spanning Trees
10.5 Minimum Spanning Trees

11 Boolean Algebra
11.1 Boolean Functions
11.2 Representing Boolean Functions
11.3 Logic Gates
11.4 Minimization of Circuits

12 Modeling Computations
12.1 Languages and Grammars
12.2 Finite-State Machines with Output
12.3 Finite-State Machines with No Output
12.4 Language Recognition
12.5 Turing Machines

College Attendance Policy

At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

Academic Adjustments for Students with Disabilities:
Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

**BMCC Policy on Plagiarism and Academic Integrity Statement:**

Plagiarism is the presentation of someone else’s ideas, words or artistic, scientific, or technical work as one’s own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC’s web side, [www.bmcc.cuny.edu](http://www.bmcc.cuny.edu). For further information on integrity and behavior, please consult the college bulletin (also available online).