CMSC 203 Course Calendar Spring 2011

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
JAN	23	24	25	26 INTRO	27	28	29	1
	30	31 Logic	1	2 Logic	3	4	5	2
	6	7 Inference	8	9 Inference	10	11	12	3
FEB	13	14 Sets	15	16 Sets	17	18	19	4
	20	21 Functions	22	23 Functions	24	25	26	5
	27	28 **HW 1** Algorithms/ Big-O	1	2 **EXAM 1**	3	4	5	6
	6	7 Number Theory	8	9 Number Theory	10	11	12	7
MAR	13	14 **InClass 1**	15	16 Proofs	17	18	19	8
	20	21 **SPRING**	22	23 **BREAK!**	24	25	26	9
	27	28 **HW 2** Sequences & Summation	29	30 Induction	31	1	2	10
	3	4 Recursion	5	6 Counting	7	8	9	11
	10	11 **EXAM 2**	12	13 Counting	14	15	16	12
APR	17	18 **InClass 2**	19	20 **HW 3** Counting	21	22	23	13
	24	25 Probability	26	27 Probability & Relations	28	29	30	14
	1	2 Relations	3	4 Relations	5	6	7	15
MAY	8	9 **InClass 3**	10	11 **HW 4** **EXAM 3**	12	13	14	16
	15	16	17	18 **FINAL**	19	20	20	17

UMBC CMSC 203
Spring 2011 Discrete Structures

Syllabus

Instructor: Mr. Paul Artola **email:** artola@umbc.edu **Phone:** (410) 455-3500 (Leave Message)

Office Hours: M/W 8:25-9:25 pm **Location:** Classroom

Text: *Discrete Mathematics and Its Applications (6th Ed.)* by Kenneth H. Rosen

Prerequisites: Math-151 (Calculus 1) and CMSC-101, CMSC-103, or CMSC-201

Course Description: Fundamental tools, topics, and concepts of discrete mathematics needed to study computer science are covered. This course emphasizes counting methods, proof techniques, and problem-solving strategies. Topics include logic, sets, numbers, functions, relations, combinatorics, discrete probability, modular arithmetic, algorithms, complexity, boolean algebras, summations and recurrences.

By the end of the course, each student should be able to do the following types of proofs: direct proof (including applying definitions, case analysis and construction), indirect proof (aka proof by contradiction or proof by negation), proof by counterexample, proof by counting argument (e.g. proof by Pigeonhole Principle), and proof by both the First and Second Principles of Induction.

Also, by the end of the semester, each student should be able to count and estimate discrete objects using the following techniques: fundamental principle of counting (addition and product rules), permutations, combinations, *k*-permutations, permutations with repeated elements, and the principle of inclusion/exclusion.

Finally, each student will gain exposure to algorithms, measurement of algorithmic complexity, Equivalence Relation and Partition theory, and elementary combinatorial circuit design and analysis.

Course Outline: The course consists of three roughly equal parts, covering assorted sections of Chapters 1-5, 7 & 10 of the text. This material breaks down as:

Part 1	Logic, Sets, Functions, Sequences and Summations	Chapter 1;
Part 2	Algorithms, Induction, Recursion and Reasoning	Chapters 2 & 3;
Part 3	Counting, Probability, Relations and Boolean Algebra	Chapters 4, 5, 7 & 10.

The following breakdowns the coverage of material week by week:

Part 1:	Week 1	Introduction;
	Week 2	Logic (1.1, 1.2, 1.3, 1.4);
	Week 3	Inference (1.5);
	Week 4	Sets (1.6 & 1.7);
	Week 5	Functions (1.8);
Part 2:	Week 6	Algorithms (2.1 & 2.2) & **Examination 1 (Wed. MAR 2)**;
	Week 7	Number Theory (2.4, 2.5);
	Week 8	**InClass 1 (Mon. MAR 14)** & Proofs (2.5);
	Week 9	Spring Break
	Week 10	Sequences & Summations (3.2) & Induction (3.3);
	Week 11	Recursion (3.4 & 3.5) & Counting (4.1, 4.2);
Part 3:	Week 12	**Examination 2 (Mon. APR 11)** & Counting (4.3, 4.4);
	Week 13	**InClass 2 (Mon. APR 18)** & Counting (4.5 & 4.6);
	Week 14	Probability (5.1 & 5.2) & Relations (7.2);
	Week 15	Relations (7.2, 7.5)
	Week 16	**InClass 3 (Mon. MAY 9) /** Boolean Algebra (10.1, 10.2, 10.3); **Examination 3 (Wed. MAY 11)**

Final Examination: Wednesday, May 18, 6:00-8:00pm.

Required Work and Expectations: Required work consists of four graded homework assignments, three in-class group assignments, three 75-minute examinations, and a cumulative, 2-hour final examination. In addition, each student is expected to *participate actively* in class. Refer to the **Course Calendar** or **Required Homework** sections for the due dates and assigned problems for the homework.

Each homework assignment consists of required readings and six problems to be solved in writing. Solving problems is the only way to learn the course material and prepare for the examinations; consequently, the homework is the most important activity of the course. Students are encouraged to work together, but **each solution must be written up individually**. Also, *each problem must be on a separate sheet of paper.* Hardcopy homework assignments must be turned in to the instructor by the end of the evening's lecture. Do not submit homework by "sliding under the instructor's office door."

Each examination is a written, closed-book, in-class test. These tests are learning experiences which enable you to demonstrate what you can do. The tests contain, but are not limited to, the types of problems encountered in the homework, examples of the text, and definitions of terms and concepts from the textbook and lecture materials. The final examination will cover material from the entire course.

Course Attendance: Attendance of the lectures is not required, although it is *highly* suggested. Early in the semester, role call will be taken solely to determine availability of slots for Drop/Add procedures. There is no guarantee, however, that all examination questions will be culled from the textbook only, so attendance of *all* the lectures is highly recommended. The class participation factor of the final course grade factors regular and faithful attendance along with asking and answering questions during the lectures, solving problems, and participating in the dialog between teacher and students.

Grading Policy: This course is offered as Pass/Fail, Audit, or Regular Grading. Grades are based on a combination of 3 regular examinations, graded homework assignments, in-class group assignments, a comprehensive final examination, and class participation. Weights for each assignment are summarized as:

200 points	=	Best 2 of 3 regular examinations;
100 points	=	Final examination;
72 points	=	Best 3 of 4 homework assignments;
24 points	=	Best 2 of 3 in-class group assignments;
4 points	=	Class participation.
400 points in total.		

The final grades are based on the scale: **A:**360-400 total points **B:**320-359 total points **C:**280-319 total points **D:**240-279 total points **F:**0-239 total points.

There will be two *hard and fast* rules about the graded assignments: **No late homeworks will be accepted** and **No Make-up Exams!** Since the lowest regular exam is dropped, anyone missing it will take a 0 score, but will not be penalized in the total point tallies. Additionally one homework assignment is not counted, so a late or missed assignment is similarly forgiven.

Required Homework: The instructor will hand out four, graded homework sets over the course of the semester. Each homework set will consist of six questions representative of the types of problems presented in the text at the end of each section. Refer to the **Course Calendar** for the due date for each assignment.

The following rules apply to the graded homework assignments:

1. Working cooperatively in groups is allowed, but each student must turn in his/her version of the assignment.
2. Write up and hand in each problem on a separate sheet of paper. (-1 point otherwise!)
3. Be sure to write your name and section on each page you hand in.
4. Write in complete, grammatically correct English sentences.
5. Always justify your answers and explain your reasoning clearly! Unjustified answers risk receiving no credit.
6. **Late homeworks will not be accepted!**

Computational Facilities: Online, you will find the CMSC203 Home Page. Included is information about the course, all the lecture notes, extra study aids and sample tests, and links to other sources of help and information. This page will change over the semester, and your input will make that happen. The URL for this page is:

http://www.csee.umbc.edu/~artola/spring11.

Much of the material on this page in in Adobe Acrobat format, so if you don't already have access to the Acrobat Reader 6.0 (or higher) software, you should download it from the Internet (www.adobe.com).

Academic Misconduct: By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.

Advice: To learn the course material well, it is necessary to solve many more problems than you are required to hand in, at least a few every day. We strongly recommend that you solve *every* problem from each assigned section of the text. Some exam questions will, more than likely, be taken directly from these unassigned problems.

1. Start early, keep up, and manage your time effectively.
2. Do not passively listen to lectures, but actively participate in each class meeting.
3. Ask questions when you do not understand completely or when you see an alternate route. Take advantage of the resources at your disposal.
4. If you find yourself falling into trouble, seek help from the instructor immediately.
5. If you get stuck on a homework problem, don't ask someone to solve it for you, but rather look for copious hints to allow you to find the rest of the solution.

Open your mind to the joy of Discrete Mathematics!