Discrete Structures Fall 2002 - Course Calendar

	SUN	MON	TUE	WED	THU	FRI	SAT	
	25	26	27	28	29 **Introduction & Logic**	30	31	**1**
September	1	2 **Labor Day**	3	4	5 **Logic**	6	7	**2**
	8	9	10	11	12 **Sets & Functions**	13	14	**3**
	15	16	17	18	19 **Functions & Sequences**	20	21	**4**
	22	23	24	25	26 **Hw1** **Algorithms & Number Theory**	27	28	**5**
	29	30	1	2	3 **Number Theory & EXAM 1**	4	5	**6**
October	6	7	8	9	10 **Hw2** **Number Theory & Reasoning**	11	12	**7**
	13	14	15	16	17 **Induction & Recursion**	18	19	**8**
	20	21	22	23	24 **Counting**	25	26	**9**
	27	28	29	30	31 **Hw3** **Recurrence Relations**	1	2	**10**
November	3	4	5	6	7 **Relations & Exam 2**	8	9	**11**
	10	11	12	13	14 **Hw4** **Relations**	15	16	**12**
	17	18	19	20	21 **Boolean Algebra**	22	23	**13**
	24	25	26	27	28 **Thanksgiving Holiday!**	29	30	**14**
December	1	2	3	4	5 **Hw5** **Exam 3**	6	7	**15**
	Final Exam Date and Time will be announced later.							**16**

Syllabus

Instructor: Mr. Paul Artola **email:** artola@comcast.net **OR** artola@umbc.edu**AIM:** artola3

Phone: 455-3500 (CS Dept. - Leave Message) **Office Hours:** Thurs. 9:30-10:30 PM

Location: ECS 222 (classroom)

Text: *Discrete Mathematics and Its Applications (4th 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, modular arithmetic, algorithms, 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 1-6 & 9 of the text. This material breaks down as:

Part 1	Logic, Sets, Functions, Sequences and Summations	Chapter 1;
Part 2	Algorithms, Induction, Numbers and Reasoning	Chapters 2 & 3;
Part 3	Counting, Recurrences, Relations and Boolean Algebra	Chapters 4, 5, 6 & 9.

The following breakdowns the coverage of material week by week:

Part 1:	Week 1	Logic (1.1, 1.2, 1.3);
	Week 2	Logic (1.1, 1.2, 1.3);
	Week 3	Sets (1.4 & 1.5) and Functions (1.6);
	Week 4	Functions (1.6) and Sequences (1.7)
Part 2:	Week 5	Big-O (1.8), Algorithms (2.1 & 2.2), and Number Theory (2.3 & 2.4);
	Week 6	Number Theory (2.3 & 2.4) and **Examination 1 (THU, October 3);**
	Week 7	Number Theory (2.3 & 2.4) and Mathematical Reasoning (3.1);
	Week 8	Induction (3.2) and Recursion (3.3);
	Week 9	Counting (4.1, 4.2, 4.3, 4.6, 5.5);
Part 3:	Week 10	Recurrence Relations (5.1 & 5.2);
	Week 11	Relations (6.1, 6.2 & 6.5) and **Examination 2 (THU, November 7)**
	Week 12	Relations (6.1, 6.2 & 6.5);
	Week 13	Boolean Algebra (9.1, 9.2, 9.3);
	Week 14	Thanksgiving Holiday!
	Week 15	Review and **Examination 3 (THU, December 5)**

Final Examination: To Be Announced

<u>Required Work and Expectations:</u> Required work consists of five graded homework 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*. Plagiarism will be dealt with severely. 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."**

Homework assignments may also be submitted via email to the instructor. Formatting issues may arise, but creative workarounds have been submitted in the past. Any electronic submissions must include you name and SSN, and be in ASCII format unless prior permission to use a different format has been granted by the instructor. Email submissions enjoy the extended due time of 11:59 p.m. the evening the assignment is due.

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.

<u>Course Attendance:</u> 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.

<u>Grading Policy:</u> This course is offered as Pass/Fail, Audit, or Regular Grading. Grades are based on a combination of 3 regular examinations, graded homework 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;
96 points = Best 4 of 5 homework 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.

<u>Required Homework:</u> This lists all the required homework for the entire semester. Refer to the **Course Calendar** for the due date for each assignment. 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.

Please write up and hand in each problem on a separate sheet of paper. The problems will be graded separately, so this is important. Be sure to write your name and section on each page you hand in. Write in complete, grammatically correct English sentences. *Always justify your answers and explain your reasoning clearly!* Unjustified answers risk receiving no credit. **Late homeworks will not be accepted!**

<u>Computational Facilities:</u> 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/fall02.

Much of the material on this page in in Adobe Acrobat format, so if you don't already have access to the Acrobat Reader 3.01 (or higher) software, you should download it from the Internet (www.adobe.com for starters). If you are new to the WWW, your instructor will help you gain access to this and other useful sources of enlightenment!

Academic Misconduct: Each student is expected to be familiar with all University and Department policies on academic misconduct. An egregious type of academic misconduct is plagiarism, which, in each of its many forms involves representing someone else's work as your own. For example, copying phrases from someone's written homework is one form of plagiarism. It is the policy of the instructor and of the department to give a course grade of F to any students guilty of academic misconduct; offenders also risk suspension from UMBC.

Advice: The most effective way to learn the course material is to solve problems, at least a few each day. It is recommended that you solve every problem in every assigned section of the text.

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 you mind to the joy of Discrete Mathematics!