MC 215 MATHEMATICAL REASONING AND DISCRETE STRUCTURES:
COURSE INFORMATION, FALL 2008

PREREQUISITES

- **QR1, and …**
- **CS106** or **MA113, or …**
- ***Permission of the instructor***

MEETING TIMES & LOCATIONS

- **Class meeting times:** Mondays 11:15-12:10; Wednesdays & Fridays 11:15-12:35
- **Location:** Harder 201

INSTRUCTOR INFORMATION

- **Name: Alice Dean**
- **Office:** 218 Harder Hall (in Math/CS Alcove)
- **Phone:** ext. 5286
- **E-mail:** adean@skidmore.edu
- **Web page:** www.skidmore.edu/~adean

OFFICE HOURS

(Subject to change as necessary)

- **No appointment needed:** Tuesday, Wednesday, Thursday 1-2 PM
- **By appointment:** Make an appointment in class, by email, or by phone
- **Drop-in:** Feel free to drop by without an appointment – I'll meet with you if I'm available or we can arrange another time.
- **Not available times:** The hour preceding each class meeting.

TEXT

- **Discrete Mathematics 7th Ed., Richard Johnsonbaugh, Pearson Prentice Hall, 2009**.

DATES OF EXAMS

TRAVEL EXCUSES NOT ACCEPTED!

- **Exam #1: Wednesday, October 8, 2008**
- **Exam #2: Wednesday, November 12, 2008**
- **Final exam: Thursday, December 18, 2008, 1:30-4:30, Harder 201**

COURSE REQUIREMENTS
(Subject to modification as needed)

- **Written, graded homework assignments – 35% of grade**
  - I will collect, grade and return 4-5 written homework assignments.
  - Assignments that are late will be penalized for each day late, and late assignments will not be accepted after I have returned that assignment to the class.
  - Assignments that are prepared on a word-processor will receive 2% extra credit (mathematical symbols and drawings may be done by hand). Submitting homework as an email attachment is fine.
- **Two in-class exams – 30% of grade**
  - As indicated above, the exams are on Wednesday, October 8, and Wednesday, November 12.
- **Final exam – 25% of grade**
  - Scheduled by the registrar on Thursday, December 18, 1:30-4:30 PM, in Harder 201.
- **Attendance and participation – 10% of grade**
  - Attendance, including arriving on time, is required for this class, and will be recorded at the beginning of each class meeting, as part of the grade. If you arrive late, it is *your* responsibility to check that your attendance has been recorded.
  - Participation in class discussions, including asking and answering questions, presenting problem solutions, etc. are expected and will be recorded as part of the grade.

COURSE DESCRIPTION

The goal of MC 215 is to provide you with mathematical tools that are used in both mathematics and computer science, and which prepare you for upper level courses in both disciplines, as well as for pursuing further study on your own. The tools fall into three main categories and are covered in Chaps. 1-9 of the textbook:

- **Proofs and algorithms:** *Proving theorems* is one of the most fundamental *mathematical* activities; designing, testing, and verifying *algorithms* is the fundamental activity of *computer science*. Since mathematics and computer science are intertwined disciplines, mathematicians need to know about algorithms and computer scientists need to know about proofs. After completing this course, you should feel confident about both endeavors. We will cover basic rules of logical inference, and types and techniques of proofs, including mathematical induction. We will also cover basics of algorithm design, recursion, and analysis of algorithms (for correctness and performance).
- **Discrete mathematics:** Discrete (not discreet!) mathematics comprises mathematics concerning objects and processes that can be modeled in discrete, rather than continuous, parts and steps. These areas of mathematics are used throughout modern mathematics and computer science. Topics include the following:
    - *Elementary logic and set theory:* Fundamental to both discrete and continuous mathematics, this is the formal structure needed to talk rigorously about true/false statements and sets of objects;
    - *Graph Theory*: A vibrant area of study in both mathematics and computer science, this encompasses questions that can be modeled by diagrams of interconnected nodes, such as a telephone network or the "web graph," in which each web page is a node, and links from one page to another from the interconnections;
    - *Combinatorics*: The study of techniques and formulas for counting complex sets, used in probability theory, analysis of algorithms, and in many other applications;
    - *Discrete Probability*, i.e., computation of probabilities (i.e., likelihood from 0 = impossible to 1 = certain), odds, and expected values for discrete events.
- **Communication skills in mathematics and computer science:** After completing this course you should feel confident about reading texts and articles, speaking in front of others about mathematics and computer science, and writing correct, clear, well-organized mathematical arguments, algorithms, and other exposition in mathematics and computer science.