MATH 245: Discrete Mathematics
Spring 2013 - Section 1 (Tu/Thu 9:30-10:45, GMCS-214)

Overview:
This course is meant to teach students the language of mathematical proofs, primarily mathematical syntax. "The sun is blue" has correct syntax, while "The sun yellow is" has incorrect syntax. Experienced provers often use abbreviations, shorthand, and elliptical phrases. Statements like "Sun's blue" can be confusing to proof learners, so in this course we will make every effort to avoid such constructions.

Learning Objectives:
Students will learn the syntax of sentential logic, quantificational logic, relations, and functions. They will learn a variety of proof techniques, including induction, and apply them to prove a wide variety of statements.

Textbook:
How To Prove It, by Daniel Velleman, 2nd edition, ISBN 978-0-521-67599-4
Students are expected to purchase the text, and to read it before class; there will be no lectures on the material. The text is quite brief and easy to understand. It contains many exercises; students are expected to solve as many as possible before class, and to have all the exercises solved in their portfolios. Portfolios may be used on the midterm and final exams, each of which will contain some questions directly from the exercises in the book.

Course Mechanics:
Students will sit in groups at the start of class. Groups may have between 1-4 students (with special permission they may be larger). Each group will be assigned a problem from the textbook. The start of class will be a brief discussion period, where each group confers on their joint solution to the problem. Students coming late will not be allowed to join a group that has already begun work.

The majority of each class period will consist of groups taking turns to present their solutions on the whiteboard to the entire class. Normally each group selects one person to present their problem, but will hand in a paper with all their names. Each person is expected to take several turns over the course of the semester. Groups that do not present will submit their solutions in writing at the end of class. Each student will receive a grade every class day (each member of a group gets the same grade).

Daily Grades:
A check-plus (10/10) is reserved for a flawless solution, presented clearly and confidently, written legibly. A check (8/10) indicates a minor flaw with the solution or presentation. A check-minus (6/10) indicates a serious flaw with the solution or presentation. A zero (0/10) is reserved for students that miss class or otherwise fail to submit/present a solution.

Attendance:

Students are expected to attend every class. Makeup daily grades will not be given under any circumstances. Three daily grades will be dropped, to account for the unexpected.

Course Mechanics:

We will cover approximately one section per course meeting, as given below. We will skip sections 3.7 and 5.4.

Jan. 22	Intro. & 1.1	Feb. 26	Section 3.3	Apr. 9	Section 4.6
Jan. 24	Section 1.2	Feb. 28	Section 3.4	Apr. 11	Section 5.1
Jan. 29	Section 1.3	Mar. 5	Section 3.5	Apr. 16	Section 5.2
Jan. 31	Section 1.4	Mar. 7	Section 3.6	Apr. 18	Section 5.3
Feb. 5	Section 1.5	Mar. 12	MIDTERM	Apr. 23	Section 6.1
Feb. 7	Section 2.1	Mar. 14	Section 4.1	Apr. 25	Section 6.2
Feb. 12	Section 2.2	Mar. 19	Section 4.2	Apr. 30	Section 6.3
Feb. 14	Section 2.3	Mar. 21	Section 4.3	May 2	Section 6.4
Feb. 19	Section 3.1	Mar. 26	Section 4.4	May 7	Section 6.5
Feb. 21	Section 3.2	Mar. 28	Section 4.5	May 16	FINAL 8-10am

Grading:

The lowest three daily grades will be dropped, leaving 25 daily grades, worth 1% of the course grade each. The midterm, on March 12, will be worth 30% of the course grade; the final, on May 16 8-10am, will be worth 45% of the course grade. Each exam will be given on the 50-100 scale, with a blank exam earning half credit. Makeup exams will be given only in the case of a documented medical emergency; please plan accordingly. The grading policy is as follows:

A 92-100, B 82-87, C 72-77, D 62-67, $\pm$ as obvious

Collaboration:

Students are strongly encouraged to study together, and to work together to solve exercises. Exams must be taken without assistance, however. Groups may be rearranged as desired before the midterm; after the midterm groups will be fixed until the end of the course.

Stars:

Students making a particularly good comment in class will earn a star; at most one star may be earned per class day per person. Stars may be redeemed as follows. For one star, you may choose the problem your group is assigned in class. For two stars, you may get 1% extra credit on the midterm. For three stars, you may get 1% extra credit on the final.

Professor:

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