Western Oregon University  
Math 231 - Elements of Discrete Mathematics  
Syllabus – Fall 2008

Class Meets: T-R 2:00 - 3:20 PM; MNB 104

Instructor: Klay Kruczek  
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Text: *Discrete Mathematics, 6th ed.*, by Richard Johnsonbaugh

Course Page: [http://www.wou.edu/~kruczekk](http://www.wou.edu/~kruczekk)

Office Hours: T 10:00-12:00, R 10:00-12:00, 3:30 - 5:00 If, at other times, you find my office door open and me in my office, I will *usually* be available, at my discretion, for a short discussion. *Take advantage of my office hours!* They are for you.

Attendance: Attendance is mandatory in the following sense: I will not have discussion notes available if you have missed class, nor will I repeat my discussion during office hours.

Course Outline: We’ll study the basic elements of logic and discrete math; covering chapters 1-3 in Johnsonbaugh; time permitting we’ll delve into further topics.

Expected Learning Outcomes:
- Understand the notion of *proposition*, and the application of the elementary logical operations to propositions
- Understand the notions of *conditional proposition* and *logical equivalence*, and apply the elementary rules of logic to prove or disprove various conditional propositions
- Understand the notions of *necessary condition*, *sufficient condition*, the *converse* of a proposition, and the *contrapositive form* of a proposition
- Be familiar with *existential* and *universal quantifiers*, and prove or disprove various conditional propositions which incorporate existential and/or universal quantifiers
- Understand how to use DeMorgan’s Laws of Logic for the negation of an expression
- Demonstrate competence in the technique of proof by *contradiction*
- Demonstrate each of the above skills in settings where propositions and/or conditional propositions are claims about subsets of basic number systems: $\mathbb{R}, \mathbb{Q}, \mathbb{Z}$, and $\mathbb{N}$
- Understand the *principle of mathematical induction* and apply it in appropriate settings
- Be familiar with sets, inclusion, union, intersection, and complement
- Be familiar with the language of functions between sets such as injective, surjective, bijective, inverse, composition, and operators
- Be familiar with the language of discrete mathematics as described in Chapter Two of the text including but not limited to sequences, products, sums, strings, and concatenation
- Extrapolate your understanding of functions to relations between sets

Webpage: Please see the course webpage for a full list of homework assignments (once they are assigned), supplemental notes (once they are written), and solutions to some problems.
**Homework:** Homework problems will be assigned from both within the text and outside the text. I will post each assignment at least one week in advance of their due date, but will usually have them up at least two weeks in advance. The homework will be collected at the start of class most Thursdays. Late homework can be turned in one class period late for 75% credit. I will drop your lowest two homework grades. You are encouraged to work together on homework assignments, but please write up your own solutions. Of course, simply copying another’s solutions will leave you quite in the dark, leading to poor quiz and/or exam grades.

**Quizzes:** I will give a quiz at the beginning of class on most Tuesdays, with the exception being when we have a test. The material on each quiz will cover a combination of NEW: topics recently covered in class and OLD: topics/problems from the most recent homework returned to you. The questions covering NEW material will usually be fairly basic. Quizzes cannot be made up under any circumstances. I will drop your lowest quiz grade.

**Exams:** Exams will be closed book and closed notes. Two midterms will be given, on 10/21 and 11/18. The final exam will be given on Tuesday 12/9 (12:00–1:50) in MNB 104. The final will be cumulative but only to a degree, in the sense that material presented since Exam 2 will comprise about 50% of the questions on the final exam. In verifiably documented circumstances (hospitalization: admission paperwork; car accident: police report; car breakdown: towing receipt, etc.), I will excuse your absence and permit you to transfer uniformly the weight of a missed exam to the remaining exams. If you have an excused absence from the final, you will be given an Incomplete (if you are passing the course). If you have an unexcused absence from any exam you will be given a zero for that exam score.

**Grading:** I (or a grader) will grade a subset (at least $\frac{1}{3}$) of the problems you submit for homework; I will personally grade all problems submitted on quizzes and exams. To get full credit for any problem solution, you must show all appropriate and relevant work. All steps are to be shown neatly, in clear and correct notation. Incorrect answers with consistent work but some small mistake will receive almost full credit. Correct answers with no appropriate work will receive almost no credit. The weighting for each component of the final grade for the course is as follows:

- Homework 20 %
- Quizzes 15 %
- Midterm 1 score 20 %
- Midterm 2 score 20 %
- Final exam score 25 %

**Appropriate Classroom Behavior:** Don’t violate anything in the Standards of Conduct in the WOU Catalog. See, for example, [http://www.wou.edu/las/natsci_math/math/academicdishonesty.html](http://www.wou.edu/las/natsci_math/math/academicdishonesty.html)

In particular any student suspected of cheating on an exam will be referred to Judicial Affairs. Assume that I will always copy at least one page from every exam you take, before I return it to you. **PLEASE PUT YOUR CELL PHONES AWAY! NO TEXTING DURING CLASS!**

**Learning Disabilities:** If you have a documented learning disability, please talk to me during the first few days of class; I will be more than happy to accommodate you in any way that I can. Also be sure to contact Disability Services at (503) 838-8250 V/TTY or ods@wou.edu.