MA 310 Discrete Mathematics

Syllabus

Instructor: Dr. William Bonnice

Objectives:

- To introduce students to the fundamental notation and concepts of discrete structures
- To engage students in mathematical thinking
- To develop techniques for proving things and for applying discrete structures
- To develop an appreciation of the utility and power of formal axiomatic systems
- To develop students' ability to write clearly and concisely about mathematical ideas and to be able to write up the solutions to mathematical problems in a way that will be easily understood
- To develop students' ability to work together and communicate mathematical ideas to one another, recognizing that we can all benefit by listening to each other's ideas and approaches
- To develop students' ability to communicate their own ideas clearly verbally as well as in writing

Teaching Strategies:

- Active student engagement in class discussions and in group work
- Active student engagement in problem solving
- Lecture and large group discussions with an expectation of student participation and questioning
- Student studying ahead in the text and coming to class with questions written which they would like answered
- Student writing about mathematics and writing clear solutions to homework problems

Course Requirements:

- Homework: approximately thirty problems due to be turned in at the beginning of every class
- Active participation and engagement in full-class and small-group discussions and activities
- Quizzes every week: approximately 9 in all (We'll throw out the lowest one).
- One one-hour exam some time around the middle of the semester
- Final Examination
- Students taking the course for **Graduate Credit** will be required to do a number of projects and make presentations. Details to come.

Methods of Assessment and Computation of Grades

	Undergrads	**Grad Students**
Homework and written questions about reading the text…	10%	10%
Self – Evaluation ……..	5%	5%
Quizzes ……	50%	40%
Exam around mid-term ……...	15%	15%
Final Exam ……..	20%	20%
Projects ……	None	10%

General Course Calendar, Topical Outline, and Assignment Due Dates:

TOPIC	CHAPTER/	PAGE	EXERCISES	ASMT.	DateDue
Logic	1.1	11	1,3,6abdf,7a-d,12,19,21,24bce, 37, 42	#1	M1/28
Propositional					

Equivalences	1.2	19	5, 6, 10a, 13		
Predicates and Quantifiers	1.3	33	6a-d,11a-f,18a-d,19bef,27,44,45		
Sets (and pp.239-240: Incl.-Excl.Prin.)	1.4	45	3,4,5,7,12,13c,22bd and Sect.4.1,p.243/44,45		
Set Operations	1.5	54	1,2,4,9,18-20,38,39		
Functions	1.6	67	1,3,5,6acg,10,11,13,17,19,56	#2	M2/4
Sequences and Summations	1.7	78	3,5 a-e,10abce,13,14,15ad,16ab, 17acd ,31,		
The Growth of Functions	1.8	90	3 , 5, 7,15,21		
Algorithms	21	104	1,5,7,17,18	#3	M2/11
Complexity of Algorithms	2.2	111	7,8,9	Quiz #1 (on Asmt. #1)	
Inclusion-Exclusion	5.5	359	1,3,9		
Relations and their Properties	6.1	382	1,3,5,7,11,15,21,27,28	# 9	M4/1
Representing Graphs & Graph Isomorphism	7.3	463	3,9,11,23,37,41,46,57		
Connectivity	7.4	473	1 ,6,11,15,31	#11	M4/15
Euler and Hamilton Paths	7.5	485	3,5,11,15,36,38,44,45	Quiz #7(on Asmt.#9)	
Shortest Path Problems	7.6	498	5,11,13,17,25		
Introduction to Trees	8.1	539	1, 2,5,15,17	#12	M4/22
Applications of Trees	8.2	546	1,3,13,14	Quiz #8(on Asmt.#10)	
Tree Traversal	8.3	560	3,4,9,12,15,17		
Spanning Trees	8.5	578	5,9,15,16(Use graph in 15)	#13	M4/29
Minimum Spanning Trees	8.6	585	1,3,7,11	Quiz #9(on Asmt.#11)	

Review Problems: At the end of each chapter that we have studied is a section of "Supplementary Exercises". Do at least two problems in these at the end of each chapter, so that is a minimum of 16 review problems.

Project Presentations and Quiz #9(on Asmt. #11)

Friday May 3: Final Exam on <u>entire</u> course.