

**Math 777 – Matroid Theory, I
Fall 2010**

Instructor : Dr. Hong-Jian Lai, 320 Armstrong Hall
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Class Schedule : Mondays, Wednesdays, and Fridays, 14:30 to 15:20 p.m.

Location : Room 123 , Armstrong Hall

Office Hours: Mondays and Wednesdays 13:30-14:20; Fridays, 8:30 – 9:30 or by appointment

Course Objectives : The objectives of this course are to educate students to master the basic of matroid theory, be familiar with some of the research front problems, and prepare students to start researches in the field.

Textbook: “Matroid Theory”, by James Oxley, Oxford University Press.
Lecture Notes of Matroid Theory, by Hong-Jian Lai

Exams, Quizzes and Homework: Homework will be assigned, collected and graded every other week, and There will be 1 midterm exam and a final exam.

	Number of Assignments/Exams		Total points	
Homework	8	50 points each	400 points	
Midterm Exams	1	100 points each	100 points	
Final Exam	1	100 points	100 points	

Course Grading Scale

Course Grade	Points
A	At least 540 points
B	480-539 points
C	420-479 points
D	360-419 points
F	At most 359 points

WVU Social Justice Statement: "West Virginia University is committed to social justice. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangement with Disability Services (293-6700)."

Disability: If you are a person with a disability and anticipate needing any type of accommodation in order to participate in your class, please advise your instructor and make appropriate arrangements with Disability Services (293-6700).

Academic Integrity Statement: The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of the West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuring sanctions, please see the Student Conduct Code at <http://www.arc.wvu.edu/rightsc/htm> . Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me *before* the assignment is due to discuss the matter.

Math 771 Courses Outline

Text: Matroid Theory, by James Oxley, Oxford University Press, (1992)

WEEK	SECTION	
1	Notes (1.1, 1.2)	Independent systems Independent axioms and base axioms, restrictions.
2	Notes (1.3, 1.4)	Rank functions and closure operator, circuit axioms,
3	2.1	geometric representations. Duality,
4	2.2, 2.3	Duals of representable and graphic matroids.
5	3.1, 3.2	Contractions, minors
6	4.1, 4.2	Elementary properties of connected matroids
7	4.2, 4.3	Connectivity function, matroid connectivity
		Midterm Exam
8	5.1, 5.2	Representability of graphic matroids, duality of graphic matroids
9	5.3, 5.4, 7.1	Whitney's 2-isomorphism theorem, serial and parallel networks serial and parallel connections.
10	6.1, 6.2	Affine and projective geometries
11	6.6, 8.1	Regular matroids, higher connectivity of matroids
12	8.3, 8.4	3-connected matroids
13	9.1, 9.2	Binary matroids
14		Additional Topics on Binary matroids
15		Further Discussion/Review/ Final Exam