

**Math 342: Graph Theory, Section 52, Spring 2010**

**Instructor:** Dr. Nafaa Chbili

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Lectures: MW 12:30-1:45, Building 41, 002

Office hours: ST 11-12 and MW 10-11.

**Prerequisite:** Set Theory and Logic.

**Textbook:** Introduction to graph theory, R. Wilson, 4<sup>th</sup> edition.

**Course Contents:** Definition and Examples of graphs, paths and cycles: Eulerian and Hamiltonian graphs. Application to “shortest path” and “Chinese postman” problems, trees and applications. Planar graphs, graphs on other surfaces, dual graphs. Coloring edges, vertices. Digraphs, Markov chains, Hall’s marriage theorem and applications. Network flows.

**Tentative Schedule**

- 1- Definitions and examples (2 weeks)
- 2- Paths and Cycles (2 weeks)
- 3- Trees (2 weeks)
- 4- Planarity (2 weeks)
- 5- Coloring graphs (3 weeks)
- 6- Digraphs (2 weeks)
- 7- Hall’s marriage theorem and applications (2 weeks)

**Course Objectives :**

- Introduce the fundamental concepts of graph theory.
- Use different methods of proofs to solve combinatorial problems.
- Design and analyze efficient algorithms for solving graph problems.
- Develop students’ interest in graph theory and its many applications.

**Student Learning Outcomes :**

- Students will achieve command of the fundamental definitions and concepts of graph theory.
- Students will understand and apply the core theorems and algorithms, generating examples as needed, and asking the next natural question.
- Students will achieve proficiency in writing proofs, including those using basic combinatorial techniques.
- Students will be able to use graph theory to model various problems from other fields of science including social science.

**Assessment:**

Test 1: 15%, Date: March 10<sup>th</sup>, 2010

Midterm (Comprehensive): 20%, Date: March 31<sup>st</sup>, 2010

Test 2: 15% , Date: May 5<sup>th</sup>, 2010

Final Exam (Comprehensive): 40%, Date: June 5<sup>th</sup>, 6-8pm.

Quizzes and Homework: 10%

**Attendance:** Attendance is required for all classes. Students who are absent for any reason more than 15% of required classes are prohibited from participating in subsequent exams and received a grade of “F” for the course.

**Grading scale:**

A	B+	B	C+	C	D+	D	F
90-100	85-89	80-84	75-79	70-74	65-69	60-64	0-59