

MATH 60103 – Graph Theory

Fall 2012
TUC 243
2:00 – 3:20 pm TR

Instructor: Dr. Efton Park
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Office Hours: 10:00 – 10:50 am MTRF and by appointment

Course Web Page: <http://faculty.tcu.edu/epark/graph.html>

Final Exam: 3:00 – 5:30 pm Thursday, December 13

Required Text: *Graphs and Applications: An Introductory Approach*, by Joan M. Aldous and Robin J. Wilson

Course Description: Graphs, directed graphs and their representations, weighted graphs, shortest path, Hamiltonian and Eulerian circuits, spanning trees, matching, connectedness, flows, Euler's formula, planarity, duality, polyhedra, coloring theorems with applications to map coloring and scheduling problems. Ramsey theory, enumeration and random walks, if time permits.

Purpose of Course: This course currently meets all or part of the following requirements for a degree:

- Elective within the Mathematics MAT, MS and PhD programs

Prerequisites: MATH 30224 or equivalent.

Course Objectives:

By the end of this course, students will:

- know the definition of graph, directed graph, and weighted graph;
- know the definition of various classes of graphs, such as complete graphs, bipartite graphs, and trees;
- understand Eulerian and Hamiltonian graphs and algorithms involving them;
- use matrices to solve problems in graph theory;
- apply graph theory to various problems in mathematics, science, engineering, and business.

Teaching Philosophy: Mathematics is not a spectator sport. To understand calculus, or any area of mathematics, you have to be actively involved in thinking about the subject and diligently doing the homework problems that I assign. While I do not forbid you from working with other students, I highly recommend that you do the homework assignments on your own because you will be on your own at exam time. In any case, I expect that the work you turn in is yours and is not simply copied from another student. I am around most of the time, so feel free to stop by or email me if you have questions about the assignments.

Instructional Methods: Like most math classes, this course will consist of daily lectures. I welcome questions from the audience, and if at any point you do not understand what I am talking about, let me know and I will try to get you back on track. On the other hand, if you wait until ten minutes before an exam to seek my help, it is unlikely that I will be able to do you much good.

Course Policies:

Attendance Policy – I do not require attendance in my classes. However, you will do much better in the course if you regularly attend the lectures. If you choose to miss class, even in the case of a TCU-excused absence, you are responsible for getting the notes from another classmate and learning the material covered on the day(s) that you miss. I will only accept late homework in the case of missing class because of a university-excused absence. If you have a university-excused absence that happens to fall on an exam date, you must notify me in advance. In the case of illness on an exam date, contact me as soon as you know that you will be unable to take the exam.

Statement on Disability Services at TCU: Texas Christian University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 regarding students with disabilities. Eligible students seeking accommodations should contact the Coordinator for Students with Disabilities in the Center for Academic Services located in Sadler Hall, 11. Accommodations are not retroactive, therefore, students should contact the Coordinator as soon as possible in the term for which they are seeking accommodations. Further information can be obtained from the Center for Academic Services, TCU Box 297710, Fort Worth, TX 76129, or at (817) 257-7486.

Academic Misconduct (Sec. 3.4 from the Student Handbook) – Any act that violates the academic integrity of the institution is considered academic misconduct. The procedures used to resolve suspected acts of academic misconduct are available in the offices of Academic Deans and the Office of Campus Life. Specific examples include, but are not limited to:

- Cheating: Copying from another student's test paper, laboratory report, other report, or computer files and listings; Using, during any academic

exercise, material and/or devices not authorized by the person in charge of the test; Collaborating with or seeking aid from another student during a test or laboratory without permission; Knowingly using, buying, selling, stealing, transporting, or soliciting in its entirety or in part, the contents of a test or other assignment unauthorized for release; Substituting for another student or permitting another student to substitute for oneself;

- Plagiarism: The appropriation, theft, purchase or obtaining by any means another's work, and the unacknowledged submission or incorporation of that work as one's own offered for credit. Appropriation includes the quoting or paraphrasing of another's work without giving credit therefore.
- Collusion: The unauthorized collaboration with another in preparing work offered for credit.

Netiquette: Communication Courtesy Code: All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. If I deem any of them to be inappropriate or offensive, I will forward the message to the Chair of the department and the online administrators and appropriate action will be taken, not excluding expulsion from the course.

TCU Campus Resources for Students: Many resources exist on the TCU campus that may be helpful to students: Mary Coats Burnet Library (257-7117); Center for Academic Services (257-7486, Sadler Hall 11); the William L. Adams Writing Center (257-7221, Rickel Bldg. 244); Student Development Services (257-7855, Student Center Rm. 220); and University Ministries (257-7830, Student Center Rm. 111). The TCU Math Clinic is also available free of charge for drop-in tutoring; I will tell you the hours of operation of the clinic when I know them.

Email Notification: Only the official TCU student email address will be used for all course notification. It is your responsibility to check your TCU email on a regular basis.

Course Format

Your grade will be determined by your performance on two exams during the semester, homework assignments, a written and oral project, and a cumulative final exam.

Homework: Throughout the course, I will regularly assign homework. Note the due date for each assignment, because I will only accept late homework in cases of an official university absence.

Project: Each student will choose a graph theory topic to write up and to present to the class. The topic must be approved by me in advance. Your project grade will be based on the written portion that you hand in to me, as well as the 45-minute presentation to the class.

Grades: Your final grade will be determined according to the following percentages:

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|------------|-----------------------------|-----|
| Exam 1 | September 20 | 15% |
| Exam 2 | November 1 | 15% |
| Homework | | 15% |
| Project | | 15% |
| Final Exam | December 13, 3:00 – 5:30 pm | 40% |

Your final grade for the course will be based on a 1000-point scale, and the grades will be assigned as follows:

| | |
|------------|----|
| 1000 – 920 | A |
| 919 – 900 | A- |
| 899 – 880 | B+ |
| 879 – 820 | B |
| 819 – 800 | B- |
| 799 – 780 | C+ |
| 779 – 720 | C |
| 719 – 700 | C- |
| 699 – 0 | F |

TCU Mission Statement

To educate individuals to think and act as ethical leaders and responsible citizens in the global community

