

Course Information

Course Number:	MATH 689
Course Title:	Advanced Graph Theory
Section:	603
Time:	MW 12:45 – 2:00 p.m.
Location:	BLOC 121
Credit Hours:	3

Instructor Details

Instructor:	Chun-Hung Liu
Office:	BLOC 631B
E-Mail:	chliu@tamu.edu
Office Hours:	TBA, TBA

Course Description

Graphs are useful models applied in many different subjects such as mathematics, computer science and economics. This course addresses theory of graphs with emphasis on deeper theorems and wider topics than MATH 613. It will concentrate on central research topics and tools in structural and extremal graph theory, which study the interplay of graph properties and structures and density of graphs. Tentative topics include Ramsey theory, probabilistic methods, fractional graph theory, graph coloring, tree-decompositions, graph minors, Turan-type problems, regularity lemma and topological methods.

Course Prerequisites

MATH 613 or equivalent or approval of the instructor.

Course Learning Outcomes

- Understand central research topics in structural and extremal graph theory.
- Work on personal research problems in the field of graph theory.

Textbook and/or Resource Materials

No required materials.

Grading Policy

- Homework assignments (100%)

For the final semester grade, students who get 90%-100% of points will be an A, 80%-90% of points will be a B, 70%-80% of points will be a C, 60%-70% of points will be a D, and an F for otherwise.

Grades record will be frequently updated at the course website at Canvas. You are required to frequently check the correctness of the grades record posted there. Requests for record correction or regrading for any question in assignments should be made by the end of the lecture after it is returned.

Late Work Policy

- No assignment will be accepted after the deadline, except for university approved excuses.
- Based on university rules, all absence notifications should be sent to the instructor in writing no later than the end of the next working day after the absence (and prior to the absence if possible).

Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy ([Student Rule 7](#)).

Course Schedule

- The due date for assignments will be announced when the dates approach.
- Topics that will be covered in this course include the following: (the total number of weeks is 15, including holidays)
 - Probabilistic methods and their applications (around 4.5 weeks)
 - Linkage (around 1 week)
 - Fractional graph theory (around 1 week)
 - Topological methods (around 1 week)
 - Perfect graphs (around 1.5 weeks)
 - Tree-decomposition and graph minors (around 3 weeks)
 - Regularity lemma (around 1.5 weeks)
 - Turan-type questions (around 1.5 weeks)

University Policies

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" ([Section 20.1.2.3, Student Rule 20](#)).

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You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

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Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University’s goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

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Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services \(CAPS\)](#).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University’s [Title IX webpage](#).

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student’s academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

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Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the 988 Suicide & Crisis Lifeline (988) or at [988lifeline.org](#) [Links to an external site.](#)

Campus-Specific Policies

Statement on the Family Educational Rights and Privacy Act (FERPA)

FERPA is a federal law designed to protect the privacy of educational records by limiting access to these records, to establish the right of students to inspect and review their educational records and to provide guidelines for the correction of inaccurate and misleading data through informal and formal hearings. Currently enrolled students wishing to withhold any or all directory information items may do so by going to howdy.tamu.edu and clicking on the "Directory Hold Information" link in the Student Records channel on the MyRecord tab. The complete [FERPA Notice to Students](#) and the student records policy is available on the Office of the Registrar webpage.

Items that can never be identified as public information are a student's social security number, citizenship, gender, grades, GPR or class schedule. All efforts will be made in this class to protect your privacy and to ensure confidential treatment of information associated with or generated by your participation in the class.

Directory items include name, UIN, local address, permanent address, email address, local telephone number, permanent telephone number, dates of attendance, program of study (college, major, campus), classification, previous institutions attended, degrees honors and awards received, participation in officially recognized activities and sports, medical residence location and medical residence specialization.