

MATH 200 - Fall 2023**SECTION 5001**, Wednesday 12:40 - 1:30 pm, Bloc
128**SECTION 502**, Wednesday 3:00 - 3:50, Bloc 160This syllabus can be modified at instructor's discretion

INSTRUCTOR: Prof. Peter Kuchment**OFFICE:** Blocker 614A**OFFICE HOURS:** TBA in Blocker 614A

Additional office hrs by appointment

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COURSE TITLE & DESCRIPTION: Horizons of Mathematics (1 Credit Hour) - A broad overview of various areas and techniques of mathematics, from logic, set theory, elements of topology, groups and symmetry, to vignettes from history of mathematics. Introduction to future courses in math degree plans and to some areas of research done by Math Department faculty. Topics may vary at the discretion of the instructor. Designed primarily for freshmen or sophomore math majors who are enrolled concurrently in Math 171 or Math 172. Others must have instructor's consent.

Learning outcomes: The course focuses on showing students a broad picture of the beauty of mathematics, improving their logical reasoning and problem solving skills, reaching a better understanding of mathematics as a course of study and as a career.

Upon successful completion of this course, students will be able to:

- Use logical reasoning to justify conclusions, both in written and in oral form.
- Solve problems applying new approaches and techniques, such as parity, Dirichlet Principle, induction, symmetry, etc.
- Understand and be able to apply various important mathematical concepts.
- Understand the enormous effectiveness of mathematics in various sciences and engineering.
- Appreciate the diversity and interconnectedness of areas of mathematics.
- Describe some milestones in mathematics, as well as some problems that still baffle mathematicians (for instance, Twin Prime Conjecture, P versus NP problem, etc.)
- Describe the input of some famous mathematicians into the development of mathematics and science.

- Identify and use various sources for internship and job searches.

Tentative Schedule

Week 1. Thinking logically: logical puzzles and some proofs as an introduction to logical reasoning and problem solving.

Week 2. Infinite sets: which one is larger?

Week 3. More on infinite sets.

Week 4. Pigeonhole Principle, Parity, and other tricks.

Week 5. Fun with topology: circuits, knots, braids, surfaces, and what not.

Week 6. A math movie

Week 7. More fun with topology.

Week 8. Symmetries and groups.

Week 9. Glimpse on the history of mathematics and some famous mathematicians (Pythagoras, Euclid, Archimedes, Hypatia, Newton and Leibniz, Abel and Galois, etc.)

Week 10. Movie: “The Proof: Andrew Wiles and the last Fermat Theorem”.

Week 11. More on history of mathematics and mathematicians (Euler, Gauss, Hilbert, Kovalevskaya, Sophie Germain, Emmy Noether, Ramanujan, etc.)

Week 12. Applied mathematics?

Weeks 13-14. Introduction to higher level math courses in math degree plans. Careers in mathematics.

Canvas: It is necessary for you to be familiar with Canvas (the learning management system supported by TAMU). You can find a link to Canvas on Howdy.

WEEKLY HOME ASSIGNMENTS will be distributed through Canvas and will have to be submitted there as well.

GRADING POLICY: A student’s grade will be determined by attendance, classroom participation, and homework. Homework may include solving problems, writing essays, etc.

Final Grade Determination:

Attendance - 10 %

Classroom participation- 25 %

Weekly Homework - 65 %

A is assigned for score $\geq 90\%$ of the total, B for $80\% \leq \text{score} < 90\%$, C for $70\% \leq \text{score} < 80\%$, D for $60\% \leq \text{score} < 70\%$, F for score $< 60\%$.

Participation’s evaluation.

25 % - A student is almost always prepared, asks questions that stimulate discussion, plays an active role in discussions, suggests good ideas for solving problems.

20 %- A student is mostly prepared, participates in discussions and sometimes offers ideas for problem solving.

10 % - Preparation and level of participation is inconsistent, does not offer to contribute to

the discussion but contributes to some degree when called on.

5 % - A student is present and not disruptive. Tries to respond when called but does not offer much. Rarely involved in a discussions.

0 %- A student is frequently absent.

A student can get an extra 5 % to move to a higher category by doing an extra assignment suggested by an instructor.

ESSAYS and HOMEWORK: Suggested topics for essays and suggested homework problems will be given as the course progresses.

Visit the instructor during office hours and seek help if needed.

SOURCES of HELP.

- If you have a question, do not hesitate to ask before, after, or during a class.
- **Office hours.** Attend office hours to get individual help and to discuss mathematics. You do not need an appointment to come to regular office hours. If your schedule does not permit you to come during the announced office hours, send the instructor an e-mail with your schedule and ask for an appointment.

POLICIES:

- If you disagree with your assignment grade, discuss it with the instructor the week the assignment is handed back.
- **No use of electronic devices is allowed during the class.**
- **Please, do not be tardy.**
- ATTENDANCE, ABSENCES and MAKE-UP: Attendance is one of your responsibilities for the class. It will be checked every class period. Come to class on time and be a good team member by actively participating in it. To be excused and have the right to miss a class or a due date for a graded work, you need to notify the instructor in advance or, if advanced notification is impossible, by the end of the second work- ing day after the absence (in the last case you must provide an explanation why the notification before the class was impossible). In addition, a written excuse must be presented upon your return to class. Specifically, if you miss a due date for a graded work due to an illness or an injury, you need to provide confirmation of your inability to attend the class that day from a medical care professional. Please note that an absence for a non-acute medical condition does not constitute an excused absence. See <http://student-rules.tamu.edu/rule7.htm> for details.
- LATE WORK POLICY: No late work will be accepted unless there is a university approved excuse in writing.
- SCHOLASTIC DISHONESTY: As an Aggie, you must maintain the highest level of honesty and integrity, both in your life and your studies. An Aggie follows the Aggie

Code of Honor:” An Aggie does not lie, cheat, steal, or tolerate those who do”.
Visit <http://student-rules.tamu.edu/aggiecode> and <http://aggiehonor.tamu.edu/> and always follow the rules of an Aggie Honor Code.

SPECIAL SERVICES:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit <http://disability.tamu.edu>.

Title IX and Statement on Limits to Confidentiality

Texas A&M University and the College of Science are committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws provide guidance for achieving such an environment. Although class materials are generally considered confidential pursuant to student record policies and laws, University employees including instructors cannot maintain confidentiality when it conflicts with their responsibility to report certain issues that jeopardize the health and safety of our community. As the instructor, I must report (per Texas A&M System Regulation 08.01.01) the following information to other University offices if you share it with me, even if you do not want the disclosed information to be shared:

Allegations of sexual assault, sexual discrimination, or sexual harassment when they involve TAMU students, faculty, or staff, or third parties visiting campus.

These reports may trigger contact from a campus official who will want to talk with you about the incident that you have shared. In many cases, it will be your decision whether or not you wish to speak with that individual. If you would like to talk about these events in a more confidential setting, you are encouraged to make an appointment with the Student Counseling Service (<https://scs.tamu.edu/>).

Students and faculty can report non-emergency behavior that causes them to be concerned at <http://tellsomebody.tamu.edu>.