Course Information

Course Number:	Math 167
Course Title:	Explorations in Mathematics
Section:	503/803
Time:	MWF 01:50 pm – 02:40 pm
Location:	**ILCB 237**
Credit Hours:	3
Course Homepage:	https://www.math.tamu.edu/courses/math167/

Instructor Details

Instructor:	Byeongsu Yu
Office:	Blocker 506B
Phone:	Math Department: 979-845-3261. There is no phone in my office, so email is the best way to reach me.
E-Mail:	byeongsu.yu@tamu.edu
Office Hours:	M 12:00 am (noon) to 1:20pm, T 2pm-3:40pm, and by appointment.
Class Webpage:	https://byeongsuyu.github.io/teaching/167f21/167f21.html

Course Description

Explorations in Mathematics (Credit 3) Application of mathematics to topics of contemporary societal importance using quantitative methods; may include elements of management science (optimal routes, planning and scheduling), statistics (sampling/polling methods, analyzing data to make decisions), cryptography (codes used by stores, credit cards, internet security), fairness (apportionment, voting), patterns (symmetry, tessellations, fractals), world health.

Course Prerequisites

High school Algebra I and II.

Special Course Designation

This is a CORE curriculum course in Mathematics

Course Learning Outcomes

Upon successful completion of this course, students will be able to satisfy the subset of these outcomes that pertain to the topics chosen for the semester:

- Design optimal and heuristic routes.
- Construct schedules that make the best use of resources.
- Display and analyze data.
- Determine good and bad samples for statistical data.
- Distinguish between good and bad inferences from data.
- Understand and apply the rules for identification numbers.
- Use cryptography to encode and decode information.
- Create a fair division of an item or items.
- Apportion using different apportionment methods.
- Understand and apply concepts of symmetry.
- Apply mathematical concepts to world health issues.

Core Objectives

The specific topics used to demonstrate the core objectives will be based on the topics chosen for the semester and will be a subset of the following

Critical Thinking

- Students will determine which graph theory model should be used to represent real-world situations.
- Students will synthesize data to look for trends and correlation along with determining if there is bias or bad sampling.
- Students will analyze codes and ciphers to make and break encrypted messages
- Students will think creatively about how resources can be allocated fairly and decide the best way to divide contested items.
- Students will analyze the symmetries of objects.
- Students will determine which mathematical model should be used to analyze a world health issue.

Communication Skills

- Students will model streets, highways and communication infrastructure as a graph.
- Students will diagram machine scheduling problems as a Gantt chart.
- Students will display quantitative data as histograms, stem plots, boxplots, and scatter plots with all units and quantities clearly labeled.
- Students will express a word or phrase using various coding systems.
- Students will express the benefits and detriments of various apportionment methods.
- Students will create a fractal.
- Students compare multiple models for world health issues.

Empirical and Quantitative Skills

- Students will solve network, graph theory, scheduling and packing questions using brute force and heuristic models.
- Students will describe data sets by finding relevant descriptive statistics. Students will determine whether or not a result is statistically significant.
- Students will use check digit schemes and prove if the check digits are able to find errors in codes.
- Students will calculate how to divide items fairly and how to apportion representatives using several different apportionment procedures, including the one currently used to apportion for the United States House of Representatives.
- Students will reflect, rotate, or translate objects.
- Students will model a world health issue.

Textbook and/or Resource Materials

Textbook

For All Practical Purposes: Mathematical Literacy in Today's World 8th , 9th or 10th edition by COMAP, W.H. Freeman. (Print or electronic). Note that when you purchase WebAssign access, you'll also have access to a digital copy of the textbook.

WebAssign Access

WebAssign will be used for homework in this class. To use WebAssign, you must purchase access. For access purchasing information and options, please visit

http://www.math.tamu.edu/courses/eHomework/

Notes that WebAssign has 2 week grace periods, which means that you can access it freely in first two weeks of the Fall semester without purchase.

Calculator

A non-programmable calculator that is able to find square roots. This calculator should NOT be on your phone, tablet, or computer. You will not be allowed to use programmable calculators (such as TI-83/84) on assignments. Please bring an approved calculator to every class. The TI-30X IIS is a good calculator, but any scientific calculator that handles square roots (and is not part of your phone, tablet, or computer) will be acceptable.

Texas A&M Student ID

Bring your student ID to each class and exam.

Proctoring

All exams (and possibly quizzes) will be proctored. More information regarding proctoring, including technological information, will be given closer to the first quiz and/or exam.

Grading Policy

The course grading will be based on the tables below. At the end of the semester, you will receive the grade you *earned*, according to the scale given. Due to FERPA privacy issues, I cannot discuss grades over email or phone.

Grade Breakdown

Activity	Date	Percentage
Online Homework	Regularly	10%
Quizzes/Classwork	Regularly	10%
Exam I	9/24/21	20%
Exam II	10/22/21	20%
Exam III	11/12/21	20%
Exam IV	12/14/21	20%
TOTAL		100%

Range	Grade
90 ≤ Average ≤ 100	A
80 ≤ Average < 90	B
70 ≤ Average < 80	C
60 ≤ Average < 70	D
Average < 60	F

Appeal Policy

Students have one week upon the return of individual grades to notify the instructor of any inaccuracies in their graded work. Students should bring all grade disputes to their instructor in an individual meeting. Due to FERPA privacy issues, grade disputes will not be discussed over email or in the classroom. Disputes on graded work MUST be handled within a week of the return of the graded assignment. Otherwise the grade will not be changed. If you have a question about your grade, please arrange an appointment with me.

Online Homework

Online Homework will be completed in WebAssign. Important information such as how to log in, how to access and complete assignments, and the Student Help Request Form can be found at

http://www.math.tamu.edu/courses/eHomework/

Do not wait until the last minute to complete your WebAssign homework because last-minute technical difficulties will not be an excuse for missing a WebAssign deadline.

Quizzes and Classwork

Quizzes will be given regularly throughout the semester and may be proctored. Some of the quiz requires to record your presentation and to submit recorded video file. More information about quizzes will be available on our course page in Canvas, as well as disseminated via TAMU email. Classwork may include but is not limited to group work in class, take home assignments and participation grades.

Exams

All exams will be proctored. You must have your student ID and approved calculator during each exam. Calculators and student ID's will be checked before and/or during each exam. Additional requirements/information about exams will be given closer to exam time.

Fourth exam

Your fourth exam covers only the material from the fourth module but will be administered during the final exam timeslot of **December 14, 3:30 pm – 5:30 pm.** You can check the time for all your final exams at https://registrar.tamu.edu/Courses,-Registration,-Scheduling/Final-Examination-Schedules

Attendance and Make-up policies

Attendance is essential to complete this course successfully.

Excused Absences

University student rules concerning excused and unexcused absences, as well as makeups, can be found at http://student-rules.tamu.edu/rule07. In particular, make-up exams and quizzes or late homework will NOT be allowed unless a **University approved reason is given to me in writing**. Notification *before* the absence is **required** when possible. Otherwise (e.g., accident or emergency), you must notify me **within two business days** of the missed exam, quiz, or assignment to arrange a makeup.

Make-up Exams and Quizzes

Make-up quizzes and exams will only be allowed due to a University approved reason (in writing). Remember, you must contact me within **two business days** of the missed assignment to qualify for a makeup. If you did not contact me in advance, you must provide me a reason via email.

Late Work Policy

Late work will NOT be accepted unless you have a University approved reason and contact me within 2 working days of the missed assignment.

Tentative Course Schedule

Week	Topic	Sections
Week 1: 8/30 – 9/3	Syllabus, and Urban Services	1.1-1.3
Week 2: 9/6 – 9/10	Urban Service, Business Efficiency	1.4, 2.1-2.3
Week 3: 9/13 – 9/17	Business Efficiency, Planning and Scheduling	2.3-2.5 3.1-3.3

Week 4: 9/20 – 9/24	Planning and Scheduling, Review, **Exam 1 (Sep 24**),	3.3-3.4, Ch. 1-3
Week 5: 9/27 – 10/1	Exploring Data: Distributions	5.1-5.9
Week 6: 10/4 – 10/8	Exploring Data: Relationships and Data for Decisions	6.1-6.3,6.5, 7.1-7.2
Week 7: 10/11 – 10/15	Data for Decisions	7.2-7.8
Week 8: 10/18 – 10/22	Review and **Exam 2 (Oct 22)**	7.6-7.8, Ch.5-7
Week 9: 10/25 – 10/29	Identification Numbers	16.1-16.3
Week 10: 11/1 – 11/5	Identification Numbers and Information Science	16.3-16.4, 17.1-17.3
Week 11: 11/8 – 11/12	Information Science, Review and **Exam 3 (Nov 12)**	17.4, Ch 16-17
Week 12: 11/15 – 11/19	Fair Division and Apportionment	13.1-13.2, 13.5-13.6, 14.1-14.2
Week 13: 11/22 – 11/26	Apportionment and Thanksgiving Holiday	14.2-14.3
Week 14: 11/29 – 12/3	Apportionment and Social Choice	14.3, 9.1-9.3
Week 15: 12/6 – 12/8	Review	
Week 16: 12/14	Final Exam**: December 14, 2021, 3:30pm-5:30 pm**	

Other Course Information

Technology Support

As much of our learning experience relies on technology, many students can get overwhelmed when something goes wrong or things get overwhelming. If you are looking for a curation of online learning resources, consider checking out https://keeplearning.tamu.edu/

If your need is specific to a course-related technology issue, consider seeking help from the 24/7 TAMU IT Help Desk. https://it.tamu.edu/help/

Learning Resources

Math Learning Center (MLC) Support

The **Math Learning Center** (MLC) offers various forms of support for math courses, both online and face-to-face, including drop-in *Help Sessions*, *Tutoring by Appointment* sessions, and other activities.

Help Sessions

The **Math Learning Center** will hold Help Sessions regularly each week. Help sessions are an opportunity for you to ask questions and get help with your homework. These sessions are led by students, and you may come and go as your schedule allows. Once determined, the schedule will be posted at

http://mlc.tamu.edu/Online-Help-Services

Suggested Homework

A list of suggested homework problems is posted at https://www.math.tamu.edu/courses/math167/ These problems will not be collected for a grade, but it is IMPERATIVE that you do the assigned problems on the suggested homework problems list to be thoroughly prepared for computer homework, quizzes, and exams. If you need help with any of these suggested homework problems, please attend my office hours, Help Session through the Math Learning Center.

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).

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

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.

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 the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can 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 National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

COVID-19 Temporary Addendum to Minimum Syllabus Requirements

The Faculty Senate temporarily added the following statements to the minimum syllabus requirements in Fall 2021 as part of the University's COVID-19 response.

To help protect Aggieland and stop the spread of COVID-19, Texas A&M University urges students **to be vaccinated and to wear masks** in classrooms and all other academic facilities on campus, including labs. Doing so exemplifies the Aggie Core Values of respect, leadership, integrity, and selfless service by putting community concerns above individual preferences. COVID-19 vaccines and masking — regardless of vaccination status — have been shown to be safe and effective at reducing spread to others, infection, hospitalization, and death.