Math 167 Syllabus

Course title and number  MATH 167 – Explorations in Mathematics
Term  Fall 2018
Meeting times and locations  
  Section 502 (Blue)……TR 11:10 AM – 12:25 PM…RICH 114
  Section 503 (Green)….TR 12:45 – 2:00 PM………RICH 114
  Section 504 (Yellow)...TR 2:20 – 3:35 PM………RICH 114

Course Description and Prerequisites
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. Prerequisites: High school Algebra I and II.

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.
Instructor Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Kathryn Bollinger, Instructional Assistant Professor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Address</td>
<td><a href="mailto:bollingr@math.tamu.edu">bollingr@math.tamu.edu</a> (Please include your full name and section color in all emails.)</td>
</tr>
<tr>
<td>Office Location</td>
<td>Blocker 247D</td>
</tr>
<tr>
<td>Office Hours</td>
<td>MW 1:00-3:00 PM in BLOC 246, and by appointment</td>
</tr>
<tr>
<td>My Webpage</td>
<td><a href="http://www.math.tamu.edu/~bollingr/">http://www.math.tamu.edu/~bollingr/</a> (Check the link to Math 167 regularly for announcements and important information, including notes, a daily schedule and other helpful links.)</td>
</tr>
<tr>
<td>Phone Number</td>
<td>Department of Mathematics: 979-845-3261</td>
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There is no phone in my office, so email is a better way to reach me.

Required Materials

- **Textbook:** COMAP *For All Practical Purpose: Mathematical Literacy in Today's World 9th ed.*, W. H. Freeman. (Print or electronic)

- **WebAssign Account Access Code:** WebAssign will be used for homework in this class. In order to use WebAssign, you must purchase an access code. For access code purchasing information and options, please visit [http://www.math.tamu.edu/courses/eHomework/](http://www.math.tamu.edu/courses/eHomework/)

- **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 the preferred calculator.

- **Texas A&M Student ID** - Bring your student ID to each class. If you have a question about your grade, please come see me in person and bring your ID.

- You need to use a pencil or a pen with blue or black ink when you submit any written work for this class. You may use additional colored pencils or pens when allowed.

Tentative Course Topics and Calendar of Activities

All changes will be announced in class or via email.

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Aug. 28, 30</th>
<th>Ch. 1 (Urban Services)</th>
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<tbody>
<tr>
<td>Week 2</td>
<td>Sept. 4, 6</td>
<td>Ch. 1 and start Ch. 2 (Business Efficiency)</td>
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<tr>
<td>Week 3</td>
<td>Sept. 11, 13</td>
<td>Ch. 2 and start Ch. 3 (Planning and Scheduling)</td>
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<td>Week 4</td>
<td>Sept. 18, 20</td>
<td>Finish Ch. 3 and Review</td>
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<tr>
<td>Week 5</td>
<td>Sept. 25, 27</td>
<td>Ch. 5 (Exploring Data: Distributions)</td>
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<tr>
<td>Week 6</td>
<td>Oct. 2, 4</td>
<td>Ch. 5, Ch. 6 (Exploring Data: Relationships) and start Ch. 7 (Data for Decisions)</td>
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<tr>
<td>Week 7</td>
<td>Oct. 9, 11</td>
<td>Finish Ch. 7</td>
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<tr>
<td>Week 8</td>
<td>Oct. 16, 18</td>
<td>Review</td>
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<tr>
<td>Week 9</td>
<td>Oct. 23, 25</td>
<td>Ch. 16 (Identification Numbers)</td>
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<tr>
<td>Week 10</td>
<td>Oct. 30, Nov. 1</td>
<td>Ch. 17 (Information Science)</td>
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<tr>
<td>Week 11</td>
<td>Nov. 6, 8</td>
<td>Review</td>
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<tr>
<td>Week 12</td>
<td>Nov. 13, 15</td>
<td>Ch. 13 (Fair Division) and start Ch. 14 (Apportionment)</td>
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<tr>
<td>Week 13</td>
<td>Nov. 20</td>
<td>Ch. 14 and THANKSGIVING HOLIDAY</td>
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<td>Week 14</td>
<td>Nov. 27, 29</td>
<td>Finish Ch. 14 and start Ch. 9 (Social Choice)</td>
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<td>Week 15</td>
<td>Dec. 4 (Redefined Thursday)</td>
<td>Finish Ch. 9 and Review</td>
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**Exam IV (during the final exam period)**

**Exam IV**, in our regular classroom
- Sec. 502(Blue): Friday, December 7th, 3:00-5:00 PM
- Sec. 503(Green): Wednesday, December 12th, 8:00-10:00 AM
- Sec. 504(Yellow): Wednesday, December 12th, 1:00-3:00 PM

[http://registrar.tamu.edu//General/FinalSchedule.aspx](http://registrar.tamu.edu//General/FinalSchedule.aspx)
Grading Policy
The course grading will be based on the tables below. Due to FERPA privacy issues, I cannot discuss grades over email or phone. If you have a question about your grade, please come see me in person.
At the end of the semester you will receive the grade you earned, according to the scale below.

Grade Breakdown
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Homework / ICAs</td>
<td>10%</td>
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<tr>
<td>Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Exam I (Chapters 1, 2, and 3)</td>
<td>20%</td>
</tr>
<tr>
<td>Exam II (Chapters 5, 6, and 7)</td>
<td>20%</td>
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<tr>
<td>Exam III (Chapters 16 and 17)</td>
<td>20%</td>
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<tr>
<td>Exam IV (Chapters 9, 13, and 14)</td>
<td>20%</td>
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Grading Scale

<table>
<thead>
<tr>
<th>range</th>
<th>grade</th>
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<tbody>
<tr>
<td>90 ≤ Average ≤ 100</td>
<td>A</td>
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<tr>
<td>80 ≤ Average &lt; 90</td>
<td>B</td>
</tr>
<tr>
<td>70 ≤ Average &lt; 80</td>
<td>C</td>
</tr>
<tr>
<td>60 ≤ Average &lt; 70</td>
<td>D</td>
</tr>
<tr>
<td>Average &lt; 60</td>
<td>F</td>
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Homework
The graded portion of your homework will mainly be online in WebAssign. Everything you will need to know about logging into your account is available at http://www.math.tamu.edu/courses/eHomework/.

There are also book problems that will not be taken up for a grade but are important for your quiz and test preparation.

In-Class Daily Assignments (ICAs)
At various times throughout the semester, you will be given assignments (that are not homework problems or quizzes) which must be completed before leaving class. In order to complete the ICAs you will need to have loose-leaf notebook paper and something to write with (a pencil or pen with blue or black ink). Always come to class with these materials. Many times the ICAs will be due within the first five minutes of class, so it is imperative that you arrive to class prepared and on time each day. Other times the ICAs may be given at the end of class, so it is also imperative that you do not leave class early. None of the grades on these assignments may be dropped unless you are missing a grade due to a verified University excused absence.

Quizzes
There will be quizzes given throughout the semester and may be announced or unannounced, in class or take home, so please keep up with the material. You will be expected to show all of your work on all problems for full credit, unless it is stated otherwise. I will use your best ten quiz grades in the final grade calculation at the end of the semester.

Exams
Everything discussed in class, quizzes, and homework is fair game for content on the in-class exams. You should also read the textbook. The first three exams will be taken during our normal class time. Our fourth test will be taken during our final exam time slot.
**Attendance & Make-up Policy**

Attendance is essential to complete this course successfully. By attendance, I mean arriving to class on time, ready to actively participate throughout the entire class time, and not leaving early.

- **Excused absences:** University student rules concerning excused and unexcused absences, as well as makeups, can be found at [http://student-rules.tamu.edu/rule07](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, you must notify me within 2 working days of the missed exam, quiz, or assignment to arrange a makeup. In all cases where an exam/quiz/assignment is missed due to an injury or illness, whether it be more or less than 3 days, I require a doctor’s note. I will not accept the “University Explanatory Statement for Absence from Class” form. Further, an absence due to a non-acute medical service or appointment (such as a regular checkup) is not an excused absence. Providing a fake or falsified doctor's note or other falsified documentation is considered academic dishonesty, will be reported to the Aggie Honor Council, and will result in an F* in the course.

- **Makeup exams** will only be allowed provided the above guidelines are met. You will be allowed to make up a missed exam during one of the scheduled makeup times provided by your instructor. According to Student Rule 7, you are expected to attend the scheduled makeup unless you have a University-approved excuse for missing the makeup time as well. If there are multiple makeup exam times, you must attend the earliest makeup time for which you do not have a University-approved excuse.

- Students with an official University-approved excused absence are permitted to make up work only for the dates of the absence. It is the student’s responsibility to contact me within the proper time period, in order to schedule make-up assignments.

- If class is officially cancelled for any reason, you can expect that the assignments due/taken on the missed class day will be due/taken the next time the class meets.

**Late Work**

All assignments due in class are due at the beginning of class. Late work without a University approved excuse may have a penalty imposed or may not be accepted at all. No extensions on online homework problem sets will be granted without a verified University excused absence.

**Grade Disputes**

If you disagree with any deduction taken on an assignment or exam handed back in class, you must bring it to my attention within two working days of it being returned to be re-graded. Due to privacy issues, I cannot discuss grades over email or phone. If you have a question about your grade, please come see me in person.

**Copyright of Materials**

All class materials (notes, quizzes, tests, homework assignments, etc.) are copyrighted and may not be copied or reproduced without permission.
Additional Help & Preparing for Exams

Your Professor
I am here to help you but I can’t help if I don’t know there is a problem. I encourage each of you to talk to me, ask questions both in and out of class, come to office hours, send emails, etc. Your best bet for success is active participation!

Class Notes
An outline of notes will be posted on our course webpage before class each day. It will be beneficial to print these out and bring them with you to class. You should review your notes after class, and make sure to get any questions you have about the material in the notes answered, before the next class meeting, if possible. A completed set of notes will NOT be posted after class. You should also review your notes when working on homework or when preparing for quizzes and exams.

Your Book
Your textbook contains very important information. I highly suggest that you read it. Remember that it takes longer to read a math book than a novel. You should read with your pencil in hand so you can take notes and work examples.

Your Homework
Your homework problems were written specifically to reinforce the material that we believe supports the objectives of the course. You should do BOTH the WebAssign and book homework problems.

Additional Practice
I strongly recommend that you practice extra problems from the book even though they are not directly for a grade. See the Additional Practice on the homework list posted on our course webpage.

Your Classmates
It is also important to communicate with your classmates. You will learn more and be able to build on each other’s ideas if you discuss the material with other people. This often makes math study time more pleasant and even more productive. Please consider setting a regular time to meet.

Help Sessions
Help sessions are an opportunity for you to ask questions and get help with your homework. These sessions are led by students, where you may come and go, as your schedule allows. Once determined, the schedule will be announced in class, posted on our course webpage, and additionally posted at
http://www.math.tamu.edu/courses/helpsessions.html.

Review Problems
Old Week-in-Review problems and solutions are linked on our course webpage. This is an excellent source of additional practice when reviewing and preparing for quizzes and exams.
Americans with Disabilities Act (ADA)

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. If you require accommodations, please see me as soon as possible so that we can make sure you have the necessary paperwork in order.

Academic Integrity

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

You are an Aggie, and so am I! The Aggie Code of Honor will be enforced.

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information on the Honor Council Rules and Procedures, consult http://aggiehonor.tamu.edu.

For this class, I encourage you to study with your classmates (unless I specifically state otherwise). However, all graded work (exams, quizzes, homework, etc.) must clearly be your own individual work, and you should not discuss graded work with anyone who has not completed that work yet. If you use a source when completing work, cite the source.

Note: It is considered Academic Dishonesty to provide falsified documentation in order to obtain an excused absence. If you provide falsified documentation, you will receive an F* in the course.

Classroom Etiquette

Electronic Device Policy

Unless given permission otherwise by me, all electronic devices must be

TURNED OFF AND PUT AWAY WHILE YOU ARE IN THE CLASSROOM!

This means the following...

- You should never have a cell phone out or turned on in the classroom -- before, during, or after class (unless you specifically have been given permission from me before class). If I hear or see your cell phone out in the classroom, I may ask you to leave class. If you are asked to leave the classroom, you will not be allowed to complete any assignments taken for a grade during the remainder of that class.

  If I see your cell phone out in the classroom (whether turned on or not) WHILE a grade is being taken (ICA, quiz, or exam), you will receive a ZERO on the assignment and you will be asked to leave the classroom.

- You are not allowed to have any other electronic device (computer, tablet, smart watch, fitness tracker, etc.) out or turned on while in the classroom (unless you specifically have been given permission from me before class).

- You should always have your calculator out and ready to use by the time class starts. On exam days, you are not allowed to have your calculator lid.

Courtesy & Respect

During class I will stay focused on teaching you mathematics, so please stay focused on learning the mathematics being taught. This means you should arrive to class on time and get out all needed materials before class starts, you should stay awake throughout class, you should not be reading a newspaper or working with materials from another course, you should refrain from discussion not related to class, and you should not leave class early (unless there is an emergency or you have talked to me before class). If I feel you are being disruptive or disrespectful during class, you may be asked to leave the room.