Math 167 – For All Practical Purposes

Catalog Description: Math 167: For All Practical Purposes (Credit 3) Application of mathematics to real world situations using quantitative methods; includes urban services and elements or management science (optimal routes, planning and scheduling), elements of statistics (sampling/polling methods, analyzing data to make decisions), codes used by stores, credit cards, internet security, cryptography. Prerequisites: High school algebra I and II.

Learning Outcomes
This course is focused on quantitative literacy in mathematics found in both business and everyday life. Upon successful completion of this course, students will be able to:

- Design optimal and heuristic routes and understand the relationship between the different methods of creating routes.
- Construct schedules that make the best use of resources and look for patterns in how schedules can be improved.
- Display and analyze data looking for patterns and relationships among the variables.
- Determine good and bad samples for statistical data.
- Quantitatively distinguish between good and bad inferences from data.
- Understand and apply the rules for identification numbers including using logical proofs to determine good and bad check-digit algorithms.
- Use cryptography to encode and decode information and evaluate the security of these codes.
- Quantitatively create and logically evaluate the fair division of an item or items as done in everyday life and business.
- Apportion using different apportionment methods and determine if the apportionment fulfills logically determined fairness criterion.

Core Objectives

Critical Thinking

- Students will use graphs and networks to determine innovative ways to achieve business efficiency.
- Students will evaluate and 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 what the best way to divide contested items.
- Students will use inquiry to resolve which methods of apportionment create fair representation.

Communication Skills

- Students will model and interpret streets, highways and communication infrastructure as graphs.
- Students will express machine scheduling problems visually as a Gantt charts.
- Students will display quantitative data as histograms, stem plots, boxplots, and scatter plots with all units and quantities clearly labeled.
- Students will express mathematical concepts both abstractly with equations and in writing.
- Students will be required to access relevant media sources and explain verbally in class how concepts from this course are found in everyday experience.
- Students will be required to answer questions during lecture concerning topics discussed in class.

Empirical and Quantitative skills

- Students will solve network, graph theory, scheduling and packing problems using brute force and heuristic models on given numerical data to draw conclusions as to the most efficient solutions.
- Students will describe numerical data sets by finding relevant descriptive statistics. Students will conclude if a result is statistically significant or not.
- 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.
Instructor: Dr. Janice Epstein, Blocker 641H, 845-3261

Office Hours: TBA. Also by appointment.

Email: j-epstein@tamu.edu. Include your full name and class/section number in all email.

Webpage: www.math.tamu.edu/~epstein/Math167

Class Meeting times: TBA.

Required Materials
- Textbook: COMAP For All Practical Purpose: Mathematical Literacy in Today's World 8th
  W. H. Freeman 978-1429215060.
- Texas A&M Student ID: You must bring your Student ID to class with you.
- A Calculator able to find square roots. Programmable calculators will be reset before exams.
- WebAssign access for online homework.
- An i>clicker.

Grading

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<td>Quizzes</td>
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<tr>
<td>Homework</td>
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<tr>
<td>Exam 1 (Chapters 1, 2, and 3)</td>
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<td>Exam 2 (Chapters 5, 6, and 7)</td>
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<td>Exam 3 (Chapters 16 and 17)</td>
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<td>Exam 4 (Chapters 9, 13, and 14)</td>
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Required Averages: A 90–100%  B 80–89%  C 70–79%  D 60–69%  F 0–59%

Homework: Homework will primarily be online. The other assignments that are part of your homework grade may include videos, written assignments, PDF form assignments or in-class activities.

Quizzes: In-class quizzes will typically occur once per week. Your i>clicker responses will be part of your quiz grade. In addition, periodically students will be required to read an online article relevant to the course content. During the following class period, students will be called on to explain what they had learned from the article. Other questions may be asked during lecture that must be answered if you are called on.

Final Exams: The complete final exam schedule is at http://registrar.tamu.edu/General/FinalSchedule.aspx

Electronic Device Policy: Cell phones, laptops, and other electronic devices must be silent and put away during class. Your i>clicker and calculator are the only exceptions allowed.

Attendance & Make-up Policy
Attendance is required in this class.
No make-up exams or late assignments will be accepted without a University-approved excused absence (see the Texas A&M University Student Rules at http://student-rules.tamu.edu/). Please contact me as soon as possible if there are any unusual circumstances that you think may be an excused absence.

If you are asked to leave class due to disruptive behavior, you may not make up any assignments missed.

An absence for a non-acute medical service or regular check-up does not constitute an excused absence.

To be excused, you must notify me in writing prior to the date of absence, if possible. Consistent with Texas A&M Student Rules, in cases where advance notification is not feasible (e.g., accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification must include an explanation of why notice could not be sent prior to the class.

For injury or illness too severe or contagious to attend class, you must provide confirmation of a visit to a health care professional affirming date and time of visit. The Texas A&M University Explanatory Statement for Absence from Class form will not be accepted. It is the student's responsibility to schedule a make-up in a timely manner.
Outside of Class
Office Hours: Please attend office hours for additional one-on-one help.

Extra Help: Evening help sessions and weekly reviews are available for extra help. See
http://www.math.tamu.edu/courses/helpsessions.html
http://www.math.tamu.edu/courses/weekinreview.html

Practice: I strongly recommend that you practice extra problems on your own from the book. See the suggested homework list on the class webpage.

Copyright
All exams, printed handouts and/or assignments, and web-materials are protected by U.S. Copyright Laws. No multiple copies can be made without my written permission. No exams or assignments may be shared with anyone outside of the class.

Academic Integrity Statement
"An Aggie does not lie, cheat, or steal or tolerate those who do."
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 please visit:

http://www.tamu.edu/aggiehonor/

Disabilities
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, in Cain Hall, Room B118, or call 845-1637. For additional information visit

http://disability.tamu.edu
Tentative Class Schedule: http://www.math.tamu.edu/courses/math167/currentsched.html
All changes will be announced in class, on the web, or via e-mail.

- Week 1 – Ch. 1 (Urban services)
- Week 2 – Ch. 2 (Business efficiency)
- Week 3 – Ch. 3 (Planning and Scheduling)
- Week 4 – Review and Exam #1
- Week 5 – Ch. 5 (Exploring Data: Distributions)
- Week 6 – Ch. 6 (Exploring Data: Relationships) and Ch. 7 (Data for Decisions)
- Week 7 – Ch. 7 (Data for Decisions)
- Week 8 – Review and Exam #2
- Week 9 – Ch. 16 (Identification numbers)
- Week 10 – Ch. 17 (Information Science)
- Week 11 – Review and Exam #3
- Week 12 – Ch. 13 (Fair Division)
- Week 13 – Ch. 14 (Apportionment)
- Week 14 – Ch. 9 (Social Choice)
- Finals – Exam #4