Texas A&M University

Core Curriculum Cover Sheet
Initial Request for a course to be considered for the Fall 2014 Core Curriculum

1. This request is submitted by (department name): Mathematics

2. Course prefix and number: MATH 167
   3. Texas Common Course Number: none

4. Complete course title: For All Practical Purposes
   5. Semester credit hours: 3

6. This request is for consideration in the following Foundational Component Area:
   - [ ] Communication
   - [x] Mathematics
   - [ ] Creative Arts
   - [ ] American History
   - [ ] Life and Physical Sciences
   - [ ] Government/Political Science
   - [ ] Language, Philosophy and Culture
   - [ ] Social and Behavioral Sciences

7. This course should also be considered for International and Cultural Diversity (ICD) designation:
   - [ ] Yes
   - [x] No

8. How frequently will the class be offered? every fall, spring and summer semesters

9. Number of class sections per semester: 4 during long semesters, 1 in the summer

10. Number of students per semester: 400 (long semesters), 100 (summer)

11. Historic annual enrollment: for the last three years: 285 86 0

This completed form must be attached to a course syllabus that sufficiently and specifically details the appropriate core objectives through multiple lectures, outside activities, assignments, etc. Representative from department submitting request should be in attendance when considered by the Core Curriculum Council.

12. Submitted by:
    Course Instructor: Janice Epstein
    Approvals:

13. Date: 2/18/2013

14. Department Head
    Date: 2/18/13

15. College Dean/Designee
    Date: 2/20/13

For additional information regarding core curriculum, visit the Texas Higher Education Coordinating Board website at www.thecb.state.tx.us/corecurriculum2014

See form instructions for submission/approval process.
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Initial Request for a Course Addition to the Fall 2014 Core Curriculum

Foundational Component Area: Mathematics

In the box below, describe how this course meets the Foundational Component Area description for Mathematics. Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts, and the application of appropriate quantitative tools to everyday experience.

How does the proposed course specifically address the Foundational Component Area definition above?

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

Describe how the proposed course develops the required core objectives below by indicating how each learning objective will be addressed, what specific strategies will be used for each objective and how student learning of each objective will be evaluated.

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

The following critical thinking skills will be assessed on in-class quizzes and exams.

• 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 (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

The following communication skills will be assessed on in-class quizzes, exams and in lecture.

• 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
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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.
  Students will work in small groups discussing mathematical solutions to relevant topics in class.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

The following empirical and quantitative skills will be assessed on in-class quizzes and exams.

- 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.

Please be aware that instructors should be prepared to submit samples/examples of student work as part of the future course recertification process.
Math 167 – For All Practical Purposes  Fall 2013

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 quantitatve 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 methods 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/~j-epstein/Math167

Class Meeting times: TBA.

Required Materials
- 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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<table>
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<tbody>
<tr>
<td>Quizzes</td>
<td>15%</td>
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<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Exam 1 (Chapters 1, 2, and 3)</td>
<td>20%</td>
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<tr>
<td>Exam 2 (Chapters 5, 6, and 7)</td>
<td>20%</td>
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<tr>
<td>Exam 3 (Chapters 16 and 17)</td>
<td>15%</td>
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<tr>
<td>Exam 4 (Chapters 9, 13, and 14)</td>
<td>20%</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 iclicker 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