Texas A&M University

Core Curriculum

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.