Syllabus

Course Title: Contemporary Mathematics

Course Number: Math QL 1030

Course Credit Hours: 3

Prerequisites: Math 1010 with a grade of C or better, or ACT score of at least 23, or Placement Test

Catalog Description: Topics from mathematics which convey to the student the beauty and utility of mathematics, and which illustrate its application to modern society. Topics include geometry, statistics, probability, and growth and form.

Objectives: To convey to the student the beauty and utility of mathematics, and to illustrate some of its application to modern society.

To convey, to the extent possible, using the content of this course, the quantitative literacy skill set adopted by the Utah State Board of Regents:

1. Interpret mathematical models such as formulas, graphs, tables and schematics and draw inferences from them.
2. Represent mathematical information symbolically, visually, numerically, and verbally.
3. Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives and select optimal results.
5. Recognize that mathematical and statistical methods have limits.
6. [Optional] Understand basic concepts describing time-varying systems, and how prediction follows from the formulation of basic laws of change, both analytically and numerically.

Course coverage will be selected from the following topics, depending on the textbook chosen, to best represent the course objectives. The topics should be chosen to build up on, not repeat, the pre-requisites of this course and should include applications requiring logarithms. However, some review may be necessary before expanding on a topic.

1. Geometry:
    a. Introduction to Euclidean Geometry
    b. Symmetry and Patterns
    c. Design paradigm: geodesic domes, minimal surfaces
    d. Tiling
    e. Fractal Geometry
2. Statistics and Probability:
    a. Collecting Data

    b. Descriptive Statistics

    c. Inferential Statistics

    d. Distributions

    e. Counting Techniques

    f. Odds and Expected Value

    g. Probability Spaces

    h. Confidence Intervals

3. Growth and Form:

    a. Exponential Growth and Decay

    b. Scaling Factors

    c. Compound Interest

4. Other topics:

    a. Modeling techniques

    b. Linear Programming

    c. Coding Information and modular arithmetic

    d. Resource Management

    e. Mathematics of Finance

    f. Networks

    g. Game Theory

    h. Planning and Scheduling

    i. Decision Making

    j. Voting Decisions, Apportionment

    k. Fair Division

Adopted Text*book*: *Mathematics All Around,* 4th Edition, Pirnot, Addison-Wesley 2010

Suggested Course: *The following is the minimal course for the chosen textbook and can be supplemented by additional sections at the discretion of the instructor.*

- *Sections 7.3 - 7.5 (Sec 7.4 can be combined with Sec 9.2. Optional: Sec 7.7.)*
- *Sections 9.1, 9.2, 9.4, 9.5 (Optional: Sec 9.3 & 9.6. In section 9.6, the formula for the effective interest rate is not given! If covering both sections 9.3 and 9.6, covering the Add-On Interest method in Sec 9.3 is sufficient.)*
- *Sections 10.1 - 10.4 (Optional: Sec 10.5 - 10.7)*
- *Optional Sections 11.1 - 11.5 **and** Sections 12.1 - 12.4*
- *Sections 13.1 - 13.3 (Optional: Sec 13.4)*
- *Sections 14.1 - 14.4 (Optional: Sec 14.5)*
- *Sections 15.1 - 15.4 (Optional: Sec 15.5)*