Math 98 Quantitative Literacy

The following document reflects the collaborative efforts of mathematics faculty members from all 17 two-year institutions in Oregon in developing a course outcome guide for Mth 98, Quantitative Literacy. Representatives from Oregon State University, Oregon Community Colleges Association, Oregon Department of Community Colleges and Workforce Development, the Higher Education Coordinating Commission, and the Oregon Department of Education have also contributed to this effort.

Mth 98, Quantitative Literacy, is a rigorous mathematics course that is designed to be part of an alternate pathway from the traditional algebra track. Rigor implies that students display conceptual understanding and procedural fluency while working on authentic applications. Throughout the course, the Rule of Four is implemented. That is, the information given in any mathematical problem is described in at least one of four ways: verbally, numerically, graphically, or algebraically. Students use this information to engage effectively with contextual, open ended mathematical problems. During their engagement, students must reason and interpret the information, make conjectures about the situation, communicate effectively, and verify their results.

A student for whom this Quantitative Literacy course may be appropriate falls under one or more of the following categories:

- ✓ One whose degree or certificate goal does not require Calculus.
- ✓ One whose path takes them to Mth 105, Math in Society.
- ✓ One whose path does not require Mth 112, Trigonometry.
- ✓ One whose goal is not within the STEM, Science, Technology, Engineering, or Mathematics, fields. This student could need some science content in their coursework but would not be considered a science major.
- ✓ One who is in a CTE program, particularly a non-STEM program.
- ✓ One who will not need sophisticated algebraic manipulation in their career field.

All Mth 98 courses cover the following five major course topics. Under each topic is a list of supporting items. Each institution must decide, depending on its student population and college mission, which supporting items will be included in each major topic. Institutions also have the latitude to determine what percentage of their course is applied to each major course topic.

1. **Applied Number Sense**
    a. Percents
    b. Relative change
    c. Unit analysis
    d. Ratios, rates and rational numbers
    e. Reasonableness
        i. Relative magnitude
        ii. Estimation
        iii. Technology based computation (order of operations)

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f. Scientific notation
g. Operations with real numbers

2. <u>Applied Algebraic Reasoning and Modeling</u>

a. Sensible variables to represent quantities
b. Simplifying expressions
c. Formula use
d. Create and solve basic linear equations
e. Recognizing functional relationships
f. Proportional reasoning
g. Recognizing the scope and limitations of a model
h. Slope and rate of change (with interpretations)
i. Understanding linear and non-linear relationships
    i. Graphically
    ii. Algebraically
    iii. Numerically
    iv. Context/Verbally
j. Model fitting to specific data

3. <u>Graphical Sense</u>

a. Reading, creating and interpreting graphs
b. Recognizing and interpreting patterns
c. Scaling and axis labelling

4. <u>Measurement</u>

a. Perimeter, area, volume, and working with formulas
b. Use of measuring tools
c. Pythagorean theorem
d. Units and dimensional analysis
e. Right triangle trigonometry
f. Similarity and scaling

5. <u>Statistical reasoning</u>

a. Means, median, and weighted means
b. Frequency graphs
c. Standard deviation
d. Normal distribution
e. Visual representation of measurements of center
f. Best use of the measure of center

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