

## HIBBING COMMUNITY COLLEGE COURSE OUTLINE

**COURSE NUMBER & TITLE:** MATH 1140 - Liberal Arts Mathematics

**CREDITS:** 3 (3 Lec / 0 Lab)

**PREREQUISITES:** Math 0971: Beginning Algebra or MATH 0961: Algebra for Liberal Arts; either course will require a grade of "C" or better, or Placement Test

### **CATALOG DESCRIPTION:**

Liberal Arts Mathematics topics include problem solving and critical thinking, sequences, consumer mathematics and financial management, measurement, geometry, counting methods and probability theory, and statistics. MNTC goal area: (4) Math & Logical Reasoning.

### **OUTLINE OF MAJOR CONTENT AREAS:**

- I. Problem solving and critical thinking
  - A. Inductive and deductive reasoning
  - B. Estimation and graphics
  - C. Problem solving
- II. Sequences
  - A. Arithmetic sequences
  - B. Geometric sequences
- III. Consumer mathematics and financial management
  - A. Percent
  - B. Simple interest
  - C. Compound interest
  - D. Installment buying
  - E. The cost of home ownership
- IV. Measurement
  - A. Length
  - B. Area and volume
  - C. Weight and temperature
- V. Geometry
  - A. Points, lines, planes, and angles
  - B. Triangles
  - C. Polygons, quadrilaterals, and perimeter
  - D. Area and circumference
  - E. Right triangle trigonometry
- VI. Counting methods and probability theory
  - A. The Fundamental Counting Principle
  - B. Permutations
  - C. Combinations
  - D. Fundamentals of probability

- E. Probability with the Fundamental Counting Principle, permutations, and combinations
  - F. Events involving “not”
  - G. Expected value
- VII. Statistics
- A. Sampling, frequency distributions, and graphs
  - B. Measures of central tendency
  - C. Measures of dispersion
  - D. The normal distribution
  - E. Scatter plots

**COURSE GOALS/OBJECTIVES/OUTCOMES:**

Students will

1. use inductive and deductive reasoning.
2. use estimation techniques to arrive at an approximate answer to a problem.
3. apply estimation techniques to information given by graphs.
4. write terms of an arithmetic sequence.
5. use the formula for the general term of an arithmetic sequence.
6. write terms of a geometric sequence.
7. use the formula for the general term of a geometric sequence.
8. express a fraction as a percent.
9. express a decimal as a percent.
10. express a percent as a decimal.
11. use the percent formula.
12. solve applied problems involving percent.
13. calculate simple interest.
14. use the future value formula.
15. use the simple interest formula on discounted loans.
16. use compound interest formulas.
17. calculate present value.
18. compute effective annual yield.
19. determine the amount financed, the installment price, and the finance charge for a fixed loan.
20. determine APR.
21. compute unearned interest and the payoff amount for a loan paid off early.
22. find the interest, the balance due, and the minimum monthly payment for credit card loans.
23. compute interest costs for a mortgage.
24. determine monthly mortgage payments.
25. prepare a partial loan amortization schedule.
26. change units of measurement in the U.S. customary system
27. use metric prefixes.
28. convert units within the metric system.
29. convert between the U.S. customary and metric systems.
30. use square units to measure area.

31. change units for area.
32. use cubic units to measure volume.
33. apply metric prefixes to units of weight.
34. convert units of weight within the metric system.
35. use relationships between volume and weight within the metric system.
36. change units of weight to and from the metric system.
37. solve problems involving points, lines, and planes.
38. solve problems involving angles.
39. solve problems involving angle relationships in triangles.
40. solve problems involving similar triangles.
41. solve problems using the Pythagorean Theorem.
42. name certain polygons according to the number of sides.
43. recognize the characteristics of certain quadrilaterals.
44. solve problems involving a polygon's perimeter.
45. find the sum of the measures of a polygon's angles.
46. compute the areas of plane regions.
47. use formulas for a circle's circumference and area.
48. use the lengths of the sides of a right triangle to find trigonometric ratios.
49. use trigonometric ratios to find missing parts of right triangles.
50. use trigonometric ratios to solve applied problems.
51. use the Fundamental Counting Principle to determine the number of possible outcomes in a given situation.
52. use the Fundamental Counting Principle to count permutations.
53. evaluate factorial expressions.
54. use the permutations formula.
55. find the number of permutations of duplicate items.
56. distinguish between permutation and combination problems.
57. solve problems involving combinations using the combinations formula.
58. compute theoretical probability.
59. compute empirical probability.
60. compute probability with permutations.
61. compute probability with combinations.
62. find the probability that an event will not occur.
63. compute expected value.
64. use expected value to solve applied problems.
65. use expected value to determine the average payoff or loss in a game of chance.
66. organize and present data.
67. determine the mean, median, mode, and midrange for a data set.
68. determine the range and standard deviation for a data set.
69. identify characteristics of normal distributions.
70. find scores at a specified standard deviation from the mean.
71. convert a data item to a Z-score.
72. utilize percentiles.
73. make a scatter plot for a table of data items.
74. interpret information given in a scatter plot.

**MNTC GOALS AND COMPETENCIES MET:**

Mathematical/Logical Reasoning

**HCC COMPETENCIES MET:**

Communicating Clearly and Effectively

Thinking Creatively and Critically

**STUDENT CONTRIBUTIONS:**

The student will attend class regularly, participate in class discussion, complete daily assignments, in-class exercises, exams, and a comprehensive final examination. The student will spend a minimum of two hours completing assignments for every hour in class. These must be accomplished in such a way that they meet minimum standards set by the instructor.

**STUDENT ASSESSMENT SHALL TAKE PLACE USING INSTRUMENTS SELECTED/DEVELOPED BY THE COURSE INSTRUCTOR.**

**SPECIAL INFORMATION: (SPECIAL FEES, DIRECTIVES ON HAZARDOUS MATERIALS):**

The student may be required to provide a calculator for this course. If a specific calculator model is required, this model will be specified by the instructor on the course syllabus. Examples of calculators which may be required include but are not limited to the following: the TI89 and the TI Voyage 200.

<b>AASC APPROVAL: July 25, 2014</b>
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<b>REVIEW DATE: July 2019</b>
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