ILLINOIS VALLEY COMMUNITY COLLEGE

COURSE OUTLINE

DIVISION: Natural Sciences and Business

COURSE: MTH 1000 Math for Liberal Arts

Date: Spring 2022

Credit Hours: 3

Complete all that apply or mark "None" where appropriate:
Prerequisite(s): MTH 0910 with a "C" or better

Enrollment by assessment or other measure? ☒ Yes ☐ No
If yes, please describe: Appropriate placement

Corequisite(s): None

Pre- or Corequiste(s): None

Consent of Instructor: ☒ Yes ☐ No

Delivery Method: ☒ **Lecture**   3 **Contact Hours** (1 contact = 1 credit hour)
                 ☐ **Seminar**   0 **Contact Hours** (1 contact = 1 credit hour)
                 ☐ **Lab**   0 **Contact Hours** (2-3 contact = 1 credit hour)
                 ☐ **Clinical**   0 **Contact Hours** (3 contact = 1 credit hour)
                 ☒ **Online**
                 ☒ **Blended**
                 ☒ **Virtual Class Meeting (VCM)**

Offered: ☒ **Fall**   ☒ **Spring**   ☒ **Summer**

CATALOG DESCRIPTION and IAI NUMBER (if applicable):
Intended as a survey course for those students interested in developing an appreciation of the role of mathematics and mathematical methods in contemporary thought. Emphasizes the understanding and application of mathematics. The course includes the study of counting methods and probability, statistics, mathematics of finance, and other selected topics such as set theory, logic, problem solving, geometry, graph theory, mathematical modeling, linear programming, and voting and apportionment. This course

does not serve as the prerequisite for any other mathematics course. IAI Equivalent: M1904

ACCREDITATION STATEMENTS AND COURSE NOTES:
None

COURSE TOPICS AND CONTENT REQUIREMENTS:
I. Counting Methods and Probability
    A. Basic concepts of probability
    B. Counting rules
    C. Probabilities using counting rules
    D. Probability of compound events
    E. Conditional probability
    F. Mutually exclusive events
    G. Independent events
    H. Odds
    I. Expected value

II. Statistics
    A. Representation of data
    B. Measures of central tendency
    C. Measures of spread
    D. Normal distributions
    E. Statistical inferences

III. Mathematics of Finance
    A. Percent applications
    B. Simple interest
    C. Compound interest
    D. Annuities
    E. Loan payments and amortization
    F. Credit cards

IV. Set Theory
    A. Basic set concepts
    B. Venn diagrams and subsets
    C. Venn diagrams and set operations with two sets
    D. Venn diagrams and set operations with three sets
    E. Application problems and cardinal numbers

INSTRUCTIONAL METHODS:
1. Lecture
2. Class discussion
3. Class participation and activities
4. Audio-visual aids - calculator, document camera, computers, etc.

EVALUATION OF STUDENT ACHIEVEMENT:
1. Homework, quizzes and exams
2. Activities (e.g. projects, case studies, etc.)

INSTRUCTIONAL MATERIALS:
Textbooks
Thinking Mathematically (Blitzer's 8th edition, Pearson, 2023)

Resources
1. MyLab Math
2. Scientific calculator
3. Computer with internet access
4. Test bank
5. Instructor solutions manual

LEARNING OUTCOMES AND GOALS:
Institutional Learning Outcomes
☐ 1) Communication – to communicate effectively;
☒ 2) Inquiry – to apply critical, logical, creative, aesthetic, or quantitative analytical reasoning to formulate a judgement or conclusion;
☐ 3) Social Consciousness – to understand what it means to be a socially conscious person, locally and globally;
☐ 4) Responsibility – to recognize how personal choices affect self and society.

Course Outcomes and Competencies
Outcome 1 - Students will demonstrate knowledge of counting methods and probability.
Competencies for Outcome 1
1.1. Students will be able to identify experiments, outcomes, and sample spaces.
1.2. Students will be able to use the Fundamental Principle of Counting.
1.3. Students will be able to calculate the number of permutations and combinations.
1.4. Students will be able to calculate probabilities using the axiomatic/theoretical approach.
1.5. Students will be able to calculate probabilities using the empirical approach.
1.6. Students will be able to calculate probabilities using counting rules.
1.7. Students will be able to calculate probabilities of compound events.
1.8. Students will be able to calculate conditional probabilities.
1.9. Students will be able to identify mutually exclusive and independent events.
1.10. Students will be able to calculate odds.
1.11. Students will be able to calculate expected values.

Outcome 2 - Students will demonstrate knowledge of statistics.
Competencies for Outcome 2
2.1. Students will be able to represent data graphically using histograms and stem and leaf displays.
2.2. Students will be able to define a population and a sample.
2.3. Students will be able to calculate the mean, median, mode, and midrange.
2.4. Students will be able to calculate the standard deviation and variance.
2.5. Students will be able to calculate the range.
2.6. Students will be able to calculate probabilities for a standard normal random variable.
2.7. Students will be able to calculate probabilities for a normal random variable.
2.8. Students will be able to calculate and interpret margin of error.

2.9. Students will be able to make a scatter plot.

2.10. Students will be able to distinguish between positive, negative, and no linear correlation

2.11. Students will be able to determine the correlation coefficient for a given data set.

2.12. Students will be able to find the equation of the regression line for a given data set.

Outcome 3 - Students will demonstrate knowledge of mathematics of finance.

Competencies for Outcome 3

3.1.   Students will be able to calculate simple interest.

3.2.   Students will be able to calculate compound interest.

3.3.   Students will be able to calculate the amount owed or earned on principle using simple and compound interest.

3.4.   Students will be able to calculate present value and use its applications.

3.5.   Students will be able to find daily periodic rates for credit cards.

3.6.   Students will be able to calculate finance charges on owed balances such as credit cards.

3.7.   Students will be able to calculate effective rates of interest to compare two or more banking accounts.

3.8.   Students will be able to calculate the future value of an annuity.

3.9.   Students will be able to calculate the present value of an annuity.

3.10. Students will be able to compute loan payments.

3.11. Students will be able to calculate the total interest paid on a loan or mortgage.

3.12. Students will be able to calculate the unpaid balance on loan or mortgage.

3.13. Students will be able to define and use the various terminology of a mortgage or loan including term, APR, and down payment.

3.14. Students will be able to explain how such variable as interest rate, and term of a loan affect the amount paid.

3.15. Students will be able to complete an amortization schedule.

3.16. Students will be able to calculate percents, sales tax, and discounts.

Outcome 4 - Students will demonstrate knowledge of set theory.

Competencies for Outcome 4

4.1.   Students will be able to use three methods to represent sets.

4.2.   Students will be able to the element and not element symbols.

4.3.   Students will be able to apply set notation.

4.4.   Students will be able to determine a set's cardinal number.

4.5.   Students will be able to recognize equal sets.

4.6.   Students will be able to recognize equivalent sets.

4.7.   Students will be able to understand the meaning of a universal set.

4.8.   Students will be able to understand the basic ideas of Venn diagrams.

4.9.   Students will be able to use the symbols subset, not a subset, and proper subset.

4.10. Students will be able to determine the number of subsets of a set.

4.11. Students will be able to use Venn diagrams to visualize set relationships.

4.12. Students will be able to perform operations with two sets (complement, union, intersection).

4.13. Students will be able to perform operations with three sets (complement, union, intersection).

4.14. Students will be able to use Venn diagrams with three sets.

4.15. Students will be able to use Venn diagrams to illustrate equality of sets.
4.16. Students will be able to use Venn diagrams to visualize application problems (e.g. survey results).
4.17. Students will be able to use the cardinal number formula for the union of sets.
4.18. Students will be able to use application information to complete Venn diagrams and answer questions about the application (e.g. survey results).