**SUSSEX COUNTY COMMUNITY COLLEGE**

**Master College Syllabus**

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| --- | --- | --- | --- | --- |
| MATH106 |  | MATHEMATICAL CONCEPTS |  |  |
| COURSE # |  | COURSE TITLE |  | CLASSIFICATION |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3 |  | 3 |  | 0 |
| CREDITS |  | CLASS HOURS |  | LAB HOURS |

**RECOMMENDED COURSE MATERIALS:**

Title: Mathematical Ideas

Author: Miller, Heeren, Hornsby

Publisher: Pearson

Edition: 12th

ISBN: 9780321693815

**OR**

Title: MYLAB Math with Pearson Etext – 18 Week Standalone Access Card – For Mathematical Ideas

Author: Miller, Heeren V, Hornsby, Heeren C.

Publisher: Pearson

Edition: 14th

ISBN13: 9780135910269

**Required:** Scientific Calculator (Required); Suggested Model: Casio FX-260

**CATALOG DESCRIPTION**

This course surveys several basic concepts of mathematics designed to give non-scientific/non-technical majors an understanding of the breadth of mathematics in areas other than computational application. Topics include: problem solving, the real number system, linear and quadratic equations, exponents and logarithms, graphs and functions, and graph theory.

**RECOMMENDATION:** SCCC has embraced a practice of directed self-choice whereby students are encouraged, through guided conversations with an advisor, to best determine their readiness for this course. Students should be aware that developmental courses exist and are available to help strengthen skills and encourage success.  Pursuing testing and/or developmental courses are entirely up to the student.  Further, testing, though providing a valuable reference point for reflection, does not create for the student an obligation to follow Accuplacer recommendations.

**TOPICS TO BE INCLUDED**

*Problem Solving* Inductive Reasoning

Number Patterns

Strategies for Problem Solving

Calculating, Estimating and Reading Graphs

*Set Theory* Classifying Real Numbers

Symbols and Terminology

Venn Diagrams and Subsets

Set Operations and Cartesian Products

Cardinal Numbers and Surveys

*Number Theory* The Fibonacci Sequence and the Golden Ratio

Phi as an Irrational Number

*The Real Numbers* Rational Numbers as Terminating and Repeating Decimals

Writing Repeating Decimals as a Quotient of Integers (optional)

Complex Numbers

C*oncepts of Algebra* Direct/Inverse Variation

Three-Part Linear Inequalities

Completing the Square

Quadratic Formula

Binomial Theorem (optional)

*Graphs, Functions and Systems of Equations and Inequalities*

Distance and Midpoint Formulas

Graphing Circles

Equations of Lines and Linear Models

Introduction to Functions

Quadratic Functions and Applications

Exponential and Logarithmic Functions

Systems of Three Equations

Using Matrices to Solve Systems (Optional)

Linear Inequalities

Linear Programming (Optional)

*Graphs Theory* Basic Concepts of Graph Theory

Euler Circuits

Hamilton Circuits and Algorithms

Trees and Minimum Spanning Trees

**COURSE COMPETENCIES/LEARNING OUTCOMES**

In a manner deemed appropriate by the instructor and approved by the department, students should demonstrate the ability to:

1. Distinguish between inductive/deductive reasoning and use both in problem solving. (GE2)
2. Perform set operations. (GE2)
3. Draw Venn diagrams. (GE2)
4. Apply Venn diagrams to problem solving. (GE2)
5. Interpret graphs and use them to solve problems (GE2)
6. Find terms of the Fibonacci sequence (GE2)
7. Recognize golden rectangles. (GE2)
8. Determine whether a number is rational or irrational. (GE2)
9. Solve variation problems. (GE2)
10. Solve problems by completing the square. (GE2)
11. Find the distance between 2 points. (GE2)
12. Find the midpoint of a line segment. (GE2)
13. Solve quadratic equations via the square root property and the quadratic formula. (GE2)
14. Graph circles (GE2)
15. Graph parabolas. (GE2)
16. Determine the equation of a circle. (GE2)
17. Recognize functions. (GE2)
18. Determine the equation of a straight line. (GE2)
19. Recognize and graph exponential functions. (GE2)
20. Recognize and graph logarithmic functions. (GE2)
21. Convert between exponential and logarithmic form of equations. (GE2)
22. Use exponentials and logarithms to solve problems. (GE2)
23. Solve system of three equations. (GE2)
24. Determine the number of vertices and edges in a graph. (GE2)
25. Determine whether two graphs are isomorphic. (GE2)
26. Determine if a graph has an Euler circuit. (GE2)
27. Determine if a graph has a Hamilton circuit. (GE2)
28. Determine if a graph is a tree. (GE2)

The ability of students to demonstrate the course competencies is assessed by a departmental midterm and a departmental final exam designed to test the knowledge and skills specified by the learning outcomes. All students are required to take the departmental exams in a proctored setting. Each of the exam grades must count for at least 25% of the student’s final grade.

Summary statistics describing student performance on the departmental exams are compiled twice a year. A comprehensive item analysis of the departmental exam performance is conducted every two years. Assessment results are used to improve the teaching and learning of Mathematical Concepts.

**GRADES COUNTED IN THE GRADE POINT AVERAGE (GPA)**

|  |  |  |
| --- | --- | --- |
| Letter Grade | Grade Points | Percent Range |
| A | 4.0 | 93-100% |
| A- | 3.67 | 90-92 |
| B+ | 3.5 | 88-89 |
| B | 3.0 | 83-87 |
| B- | 2.67 | 80-82 |
| C+ | 2.5 | 78-79 |
| C | 2.0 | 70-77 |
| D | 1.0 | 65-69 |
| F | 0.0 | 0-64 |
| FN | Fail no-show |  |

MATH106

Rev. 8/2022 (lac)