PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS
THE STRUCTURE OF THE NUMBER SYSTEM
MATH 1410

Class Hours: 3.0
Laboratory Hours: 0.0
Credit Hours: 3.0
Date Revised: Spring
03

Catalog Course Description:

This course helps students to make connections within mathematics and between math and other areas of life, to gain a conceptual understanding of math, and to be involved in inquiry learning, hands on activities, and communications. Topics include problem solving, inductive and deductive reasoning, sets and relations, numeration systems, number theory, rational numbers, mathematical modeling, and algebraic applications.

Entry Level Standards:

Students must be able to read at the college level.

Prerequisites:

High school algebra I and algebra II and geometry and ACT math score of at least 19; or DSPM 0850 or equivalent math placement score.

Textbook(s) and Other Reference Materials Basic to the Course:

Textbook:

Required Supplies:
Scientific calculator with statistical capabilities/fractional capabilities is required. A graphing calculator such as the TI-83 Plus is recommended.

I. Week/Unit/Topic Basis:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction, Exploration with Patterns, and Using the Problem-solving Process</td>
</tr>
<tr>
<td>2</td>
<td>Inductive and Deductive Reasoning, and Using a Calculator as a Problem-solving Tool, Review, Test #1</td>
</tr>
<tr>
<td>3</td>
<td>Sets, Set Operations and Their Properties and Relations and Functions</td>
</tr>
<tr>
<td>4</td>
<td>Numeration Systems (Including Other Bases and Multicultural)</td>
</tr>
<tr>
<td>5</td>
<td>Modeling Whole Number Operations, in Base Ten as Well as Other Bases.</td>
</tr>
</tbody>
</table>
II. Course Objectives*:

A. Master the critical thinking skills necessary to interpret set notation and Venn diagrams. VI.1,3,5

B. Construct, manipulate, and discuss mathematical systems. VI.1,3

C. Master the real number system. VI.1,3

D. Understand mathematical reasoning in order to read, comprehend, and construct mathematical arguments. VI.1

*Roman numerals after course objectives reference goals of the university parallel program.

III. Instructional Processes*:

Students will:

1. Successfully understand and interpret real world problems. Problem Solving and Decision Making Outcome, Transitional Strategies, Active Learning Strategies

2. Successfully use a variety of problem solving strategies, both inductive and deductive reasoning. Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Active Learning Strategies

3. Work, either individually or in a group setting, to solve problems from different occupational fields. Solutions must be mathematically correct and be clear and correct in terms of the related occupational field. An example might include using sets and Venn diagrams to analyze given information about the number of students and student preferences and dislikes to determine an optimal reorganization of those students into smaller work groups. Communication Outcome, Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Transitional Strategies, Active Learning Strategies
4. Use calculator and computer technology as problem solving and exploration tools. *Technological Literacy Outcome, Numerical Literacy Outcome, Active Learning Strategies*

5. Use a wide variety of mathematical modeling tools, both virtual and physical. *Technological Literacy Outcome, Numerical Literacy Outcome, Active Learning Strategies*

6. Keep a journal of real life math problems that are encountered. *Communication Outcome, Numerical Literacy Outcome*

*Strategies and outcomes listed after instructional processes reference Pellissippi State’s goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

IV. Expectations for Student Performance*:

Upon successful completion of this course, the student should be able to:

1. Use set notation and Venn diagrams in application problems. A
2. Utilize inductive and deductive reasoning. A, D
3. Utilize and manipulate the real number system. B, C, D
4. Master and explain various problem-solving strategies. A, B, D
5. Demonstrate an understanding of set notation. A
6. Differentiate between a finite and an infinite set. A
7. Manipulate relations between sets by using such terms as subsets, proper subsets, equality of sets, universal set, and empty set. A, B
8. Demonstrate an understanding of set-builder and roster notation. A
9. Manipulate operations on sets: intersection, union, difference, complement, and Venn diagrams. A, B
10. Demonstrate knowledge of commutative, associative, and distributive laws. A, B, D
11. Define natural numbers, whole numbers, rational numbers, irrational numbers, and real numbers. A, B, C, D
12. Demonstrate knowledge of division algorithm and divisibility tests. B, C, D
13. Define prime numbers, composite numbers, greatest common divisor, and least common multiple. B, C
14. Compute prime factorization of a number and use in applications. C
15. Use modeling tools to demonstrate mathematical ideas and processes. B
16. Demonstrate a greater understanding and appreciation of mathematics and its applications to other disciplines. A

*Letters after performance expectations reference the course objectives listed above.

V. Evaluation:
A. Testing Procedures:

Students are evaluated primarily on the basis of tests, quizzes, homework, portfolio, and/or a comprehensive final exam. A minimum of five major tests (in addition to the final) is recommended.

B. Laboratory Expectations:

Students will be expected to keep a portfolio of all laboratory experiments and projects. The portfolio will serve as a collateral file of future teaching references.

C. Field Work:

N/A

D. Other Evaluation Methods:

Excessive absences may lower the final grade.

E. Grading Scale:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93 – 100</td>
<td>A</td>
</tr>
<tr>
<td>88 – 92</td>
<td>B+</td>
</tr>
<tr>
<td>83 – 87</td>
<td>B</td>
</tr>
<tr>
<td>78 – 82</td>
<td>C+</td>
</tr>
<tr>
<td>70 – 77</td>
<td>C</td>
</tr>
<tr>
<td>60 – 69</td>
<td>D</td>
</tr>
<tr>
<td>Below 60</td>
<td>F</td>
</tr>
</tbody>
</table>

VI. Policies:

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog). Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

B. Academic Dishonesty:

Any student found engaging in an act of academic dishonesty will be promptly dismissed from the course with a grade of F. Academic dishonesty includes the following:

Plagiarism—presenting someone else’s words or ideas as your own;
Collusion—allowing other people to write, to revise, or to alter significantly the text of a paper that is supposed to be your work alone.