Course Prefix & Number: MATH 117  
Credit Hours: 3-3-0

Course Title: Elementary Number Structure

Course Prerequisites: A grade of “C” or higher in MATH 102

Textbook(s): BPCC Custom Manipulative Kit, ISBN: 9780321854094

Course Description: This course is designed for elementary education majors. The emphasis of the course is teaching number sense and problem solving. Topics include problem-solving strategies; number patterns; numeration system of base ten; conceptual understanding of addition, subtraction, multiplication and division of whole numbers; algorithms for operations of whole numbers; properties of whole numbers; estimation and mental math skills; factors; multiples; prime and composite numbers; prime factorization; meaning of fractions; equivalent fractions; mixed numbers and comparison of fractions; algorithms for operations of fractions; meaning of decimals; converting decimals to fractions; algorithms for operations of decimals; meaning of ratio and proportions and proportional reasoning; meaning of percent and converting between percent; decimals and fraction equivalency.

Learning Outcomes:
At the end of this course, the student will:

A. understand the four step process to approach solving problems and apply various problem-solving strategies to solve problems;
B. have a conceptual understanding of the operations of whole numbers and their properties and perform algorithms related to addition, subtraction, multiplication and division of whole numbers;
C. have knowledge of how the terms “factors, multiples, prime, and composite” relate to each other and apply the rules of divisibility to determine the factors of a positive whole number, perform the Fundamental Theorem of Arithmetic on any positive whole number and use this to find the Greatest Common Divisor and Least Common Multiple for a set of positive whole numbers;
D. have a conceptual understanding of the operations of fractions and perform algorithms related to addition, subtraction, multiplication and division of fractions and mixed numbers;
E. have a conceptual understanding of the operations of decimals and perform algorithms related to addition, subtraction, multiplication and division of decimals;
F. have a conceptual understanding of ratio, proportions and proportional reasoning; and
G. have a conceptual understanding of percent and finding the equivalencies between percent, fractions and decimals.

To achieve the learning outcomes, the student will or will be able to:
(The letter designations at the end of each statement refer to the learning outcome(s).)

1. understand Poyla’s 4 step approach to problem solving; (A)
2. demonstrate the use of the eight problem solving strategies; (A)
3. identify mathematical patterns; (A)
4. identify the levels of Bloom’s Taxonomy; (A)
5. classify numbers; (B)
6. demonstrate understanding of the base ten system; (B)
7. round whole numbers to indicated place value; (B)
8. write whole numbers in both word and expanded form; (B)
9. addition, subtraction, multiplication, and division of whole numbers using standard algorithm; (B)
10. addition, subtraction, multiplication, and division of whole numbers using alternate algorithms; (B)
11. demonstrate understanding of teaching methods of adding, subtracting, multiplying, and dividing whole numbers; (B)
12. apply properties of whole numbers; (B)
13. use manipulatives to demonstrate understanding of the operations of addition, subtraction, multiplication, and division of whole numbers; (B)
14. apply the divisibility rules; (C)
15. recognize factors, multiples, prime, and composite numbers; (C)
16. apply the Fundamental Theorem of Arithmetic; (C)
17. find the Greatest Common Divisor; (C)
18. find the Least Common Multiple; (C)
19. use manipulatives to demonstrate understanding of prime, composite, factors, multiples, GCD, and LCM; (C)
20. recognize proper fractions, improper fractions, and mixed numbers; (D)
21. order and compare fractions and mixed numbers; (D)
22. addition, subtraction, multiplication, and division of rational numbers using standard algorithm; (D)
23. addition, subtraction, multiplication, and division of rational numbers using alternate algorithms; (D)
24. use manipulatives to demonstrate understanding of the operations of addition, subtraction, multiplication, and division of rational numbers; (D)
25. apply properties of rational numbers; (D)
26. demonstrate understanding of teaching methods of adding, subtracting, multiplying, and dividing rational numbers; (D)
27. recognize decimal numbers; (E)
28. round decimal numbers to indicated place value; (E)
29. write decimal numbers in both word and expanded form; (E)
30. order and compare decimal numbers; (E)
31. addition, subtraction, multiplication, and division of decimal numbers using standard algorithm; (E)
32. addition, subtraction, multiplication, and division of decimal numbers using alternate algorithms; (E)
33. use manipulatives to demonstrate understanding of the operations of addition, subtraction, multiplication, and division of decimal numbers; (E)
34. apply properties of decimal numbers; (E)
35. demonstrate understanding of teaching methods of adding, subtracting, multiplying, and dividing decimal numbers; (E)
36. recognize ratios and proportions; (F)
37. solve proportions using cross product; (F)
38. solve proportions using a table; (F)
39. recognizing percent; (G)
40. use manipulatives to demonstrate understanding of percent; (G)
41. convert between percentage, fractions, and decimals; (G) and
42. solve applications of percent; (G)

Course Requirements: All students are required to take a comprehensive final exam and give one formal lesson presentation.
Course Grading Scale:
90 – 100 = A
80 – 89 = B
70 – 79 = C
60 – 69 = D
0 – 59 = F

Attendance Policy: The college attendance policy is available at http://www.bpcc.edu/catalog/current/academicpolicies.html

Course Fees: This course is accompanied with an additional non-refundable fee for supplemental materials, laboratory supplies, software licenses, certification exams and/or clinical fees.

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