Capital Community College
Course Outline

Number Systems

SECTION I

SUBJECT AREA & COURSE NUMBER: Math 299

COURSE TITLE: Number Systems

COURSE CATALOG DESCRIPTION: This course addresses the structure and properties of four number systems - whole number, integer, rational, and real as well as mathematical reasoning and sets. Topics include: numeration systems; operations of addition, subtraction, multiplication, and division; factors and multiples; prime and composite numbers; decimals and percents; and patterns of reasoning. Exploring techniques for explaining and communicating the mathematical ideas studied is also a theme of the course. Number Systems is of special interest to prospective elementary school teachers or to those who seek a mathematics elective.

LECTURE HOURS PER WEEK: 3 **CREDIT HOURS:** 3

PREREQUISITE(S): Math 131 or qualifying score on placement test

SECTION II

A. SCOPE:
The first objective of *Number Systems* is to enable the student to recognize and apply the structure of four number systems - whole number, integer, rational, and real - and to use basic rules of mathematical logic. The second objective is to provide the student with techniques for explaining and communicating the ideas studied.

B. REQUIRED WORK: Determined by the instructor as described in the course syllabus

C. ATTENDANCE AND PARTICIPATION: Students are expected to attend each class, arrive on time, take exams at the scheduled times, and participate in the in-class learning process. (Specific instructor policies are included on the course syllabus)

D. METHODS OF INSTRUCTION: The methods of instruction are determined by each instructor and may include but are not limited to lecture, lecture/discussion, small group collaborative learning, experiment/exploration, distance learning, student presentations, use of technologies such as audio-visual materials, computer, language laboratory, and calculator.

E. OBJECTIVE, OUTCOMES, ASSESSMENT

The following objectives and outcomes represent the department's core requirements for student achievement.

LEARNING OBJECTIVES	LEARNING OUTCOMES	ASSESSMENT METHODS
To demonstrate an understanding of:	**Student will:**	**As measured by:**
Mathematical Reasoning and problem solving	a) Apply inductive reasoning b) Show that inductive reasoning may not yield true generalizations c) Apply deductive reasoning d) Identify hypothesis and conclusion e) Disprove by counterexample f) Write statements in "if then" form	Written in- class quizzes, tests, and examinations; presentations to
	g) Write the converse of a statement h) Write statements in "if and only if" format i) Draw inferences from patterns j) Apply problem solving strategies	the the class; out-of-class projects, written
Basic ideas of sets	a) Create sets b) identify equal, equivalent, finite, and infinite sets c) Operate on sets-union, intersection, complement, Cartesian product d) Use Venn diagrams to represent set relations	reports; portfolios; homework assignments
Concepts of number and numeration system	a) Determine what equivalence classes have in common b) Represent whole numbers using various systems of numbers	
Number System	a) Identify and apply the axioms of four systems - whole number, integer, rational number, and real number b) Add, subtract, multiply, and divide numbers for each of the 4 number systems	
Basic number theory	a) Apply divisibility theorems and tests b) Find the factors of a whole number c) Determine whether a number is prime or composite d) Find the LCM and GCF	
Communicating mathematics	a) Provide concrete representations for numbers and operations on numbers	
Estimation	a) Round off numbers b) Do mental arithmetic c) Estimate numerical answers	

Note 1: The foregoing table of learning outcomes should not be considered exhaustive; other learning outcomes may also support the objectives. The list is not intended to limit the learning outcomes that can be used to support the objectives.

Note 2: The order in which the learning outcomes are addressed and the relative emphasis given to each will vary from instructor to instructor.

Note 3: There is no expectation that an instructor will employ all the assessment methods or any particular subset of them. Also, the particular list of assessment methods is not exhaustive. Other methods that measure the learning outcomes may be used.

Note 4: It is important to recognize that courses are not delivered in a social vacuum. Any bona fide assessment of a course must take account of out-of-class life demands on students that adversely impact academic success.

F. TEXTS AND MATERIALS:

Mathematics for Elementary Teachers: An Interactive Approach 2nd ed.by Sonnabend et al., publisher: Harcourt College Publishers

G. INFORMATION TECHNOLOGY:

Texas Instruments™ "Math Explorer" calculator