

COURSE LEARNING OUTCOMES

DEPARTMENT: Mathematics

COURSE #: 30800 COURSE TITLE: Bridge to Advanced Mathematics CATEGORY: TERM OFFERED: Spring 2012 PRE-REQUISITES: Departmental permission PRE/CO-REQUISITES: HOURS/CREDITS: 3hrs/3credits DATE EFFECTIVE: 1/24/14 COURSE COORDINATOR: B. Santoro	CATALOG DESCRIPTION : This course explores the logical and foundational structures of mathematics, with an emphasis on understanding and writing proofs. Topics include set theory, logic, mathematical induction, relations and orders, functions, Cantor's theory of countability, and development of the real number system. Textbooks: <ul style="list-style-type: none">• <i>Mathematical Proofs</i>, 3rd edition, by Chartrand, Polimeni, and Zhang; Addison-Wesley Publ.• <i>Elementary Analysis</i>, 2nd edition, by Ross, Springer Publ.
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COURSE LEARNING OUTCOMES:

After taking this course, the student should be able to:	Contributes to Departmental Learning Outcome(s):
1. Construct proofs of basic set-theoretic identities involving unions, intersections, and cartesian products	e1, e2, g, g
2. Formulate the negation, converse, and contrapositive of a quantified implication, both linguistically and in symbolic form.	e1, e2, g
3. Demonstrate an understanding of the concept of a "counterexample" and be able to provide appropriate instances.	e1, e2, g
4. Provide written proofs of statements involving elementary divisibility properties of the integers.	e1, e2, f, g
5. Demonstrate knowledge of abstract functions and relations, including being able to state precise definitions of basic concepts.	e1, e2, f, g
6. Demonstrate an understanding of the Principle of Mathematical Induction	a, e1, e2, f, g
7. Demonstrate knowledge of the elementary theory of cardinality, including examples and applications of the main theorems.	e1, e2, g
8. Demonstrate an understanding of the order structure of the real numbers, and the relationship of this structure to the completeness property.	a, e1, e2, f, g

COURSE ASSESSMENT TOOLS:

1. Attendance
2. Quizzes (20%)
3. Three mid-term exams (20% each, with lowest dropped)
4. Final exam (40%)

DEPARTMENTAL LEARNING OUTCOMES:

The mathematics department, in its varied courses, aims to teach students to

- a. *perform numeric and symbolic computations*
- b. *construct and apply symbolic and graphical representations of functions*
- c. *model real-life problems mathematically*
- d. *use technology appropriately to analyze mathematical problems*
- e. *state (e1) and apply (e2) mathematical definitions and theorems*
- f. *prove fundamental theorems*
- g. *construct and present (generally in writing, but, occasionally, orally) a rigorous mathematical argument.*