ROWAN UNIVERSITY
Department of Mathematics

Syllabus
Math 01.498 - Mathematics Seminar

Catalog Description:

Math 01.498 Mathematics Seminar 3 s.h.

(Prerequisites: Math 01.340 Modern Algebra I, Math 01.231 Ordinary Differential Equations, Math 01.330 Introduction to Real Analysis I and either Math 01.310 College Geometry or Stat 02.360 Probability & Random Variables with a grade of C- or better in all prerequisites)

This course is designed to integrate students' knowledge of mathematics and to further developing their problem solving abilities. The course content includes problem-solving techniques, a review of the literature of mathematics, solving problems drawn from a variety of current resources, and study of techniques of proof and issues in the philosophy of mathematics and its foundations. Additionally, each student is required to write and to present orally a research report on a mathematical topic.

Objectives:

At the end of the seminar, students will be able to:

1. Demonstrate various problem solving techniques as applied to advanced mathematical problems.

2. Demonstrate various methods of proof.

3. Cite the literature, implications, and applications of a topic from mathematics.

4. Cite or demonstrate the developing relationship between computers and problem solving in mathematics.

5. Write mathematical prose and explain orally undergraduate mathematics to others.

Topics:
1. Introduction to Problem Solving

Patterns and algorithms.
Discovery, invention, and generalization.
Heuristic strategies.
Logic and proof.
Types of problems.
Historic and current unsolved problems.
Recently solved problems.

2. Solving Problems from Various Areas

Algebra

Analysis

Foundations

Geometry

Emerging areas

3. The Literature of Mathematics

Journals, reviews, and abstracts.

Developing a mathematical prose.

Writing mathematical prose.

Exposition of mathematical topics.

TEXTS:

None specified but certain Resource materials will be used such as:

Journals:

Journal for Recreational Mathematics

The Mathematics Magazine

The College Mathematics Journal

The Mathematics Teacher

The Arithmetic Teacher

School Science and Mathematics

Scientific American

The Mathematics Association of American Monthly

The Mathematics Intelligencer

Books:

* Davis, Hersh, Marchisotto, The Mathematical Experience-Study Edition, Birkhauser, Boston, 1999.

*Young, Robert M., Excursions in Calculus-An Interplay of the Continuous and the Discrete, The Math Association of America, 1992.

* Usiskin, Peressini, Marchisotto, Stanley, MATH FOR HIGH SCHOOL TEACHERS--aN ADVANCE PERSPECTIVE, Prentice Hall, 2002

Krantz, Steven G., A Primer of Mathematical Writing, American Mathematical Society, 1997.

Krantz, Steven G., Techniques of Problem Solving, American Mathematical Society, 1997.

Agrawal, O.P., GRE Mathematics Test, Research and Education Assoc., Piscataway, NJ