**Mathematics 1116**  
Excursions in Mathematics  
Autumn, Spring  
3 credits

**Catalog Description:**  
Critical thinking and problem solving, with relevant topics met in everyday life. Appropriate for non-science majors.

**Prerequisite:**  
Math Placement Level R or higher; or credit for 1075, 75, 104, 1073 or 1074; or ACT math score $\geq 22$ or SAT math score $\geq 520$ (scores must be less than 2 years old).

**Exclusions:**  
Not open to students with credit for Math 1152 or higher, or for quarter math class numbered 153 or higher.

**Purpose of Course:**  
The emphasis in this course is on intuitive understanding and developing some facility for applying mathematical ideas to problem solving.

**Follow-up Courses:**  
None. Math 1116 is a terminal course.

**Text:**  
*Excursions in Modern Mathematics*, 8th edition, by Tannenbaum, Pearson,  
ISBN 9780321825735

**Topics List:**

1. Graph theory: graphs, Euler and Hamilton circuits, algorithms for Traveling Salesman Problem, spanning trees, etc.
2. Voting & apportionment: preference ballots; apportionment paradoxes; Congressional apportionment; methods of Jefferson, Adams, and Webster.
4. Symmetry: Rigid motions, rosettes, friezes, rudiments of group theory.
5. Counting & probability: counting principles, permutations and combinations, multiplication rule, randomness, probability.
6. Fractals: recursive definitions, standard examples (Koch snowflake, Sierpinski gasket etc.), self-similarity, fractional dimension.
7. Linear programming: mixture problems, examples in low dimension, corner point principle, algorithms.