

GENERAL EDUCATION COURSE PROPOSAL
UNIVERSITY OF MARY WASHINGTON

Use this form to submit **EXISTING** courses for review. If this course will be submitted for review in more than one category, submit a separate proposal for each category.

COURSE NUMBER:	FSEM 100MM		
COURSE TITLE:	PIRATES, LIARS & PIGEONS		
SUBMITTED BY:	Randall Helmstutler and Keith Mellinger	DATE:	1/15/08
<i>This course proposal is submitted with the department's approval. (Put a check in the box to the right.)</i>			X
<i>If part of a science sequence involving two departments, both departments approve.</i>			

THIS COURSE IS PROPOSED FOR (check one).

First-Year Seminar (<i>indicate in the rationale if this will also count for major credit</i>)	X
Quantitative Reasoning	
Global Inquiry	
Human Experience and Society	
Experiential Learning	
Arts, Literature, and Performance: Process	or
	Appreciation
Natural Science (<i>include both parts of the sequence</i>)	

NOTE: See the report entitled "General Education Curriculum as Approved by the Faculty Senate," dated November 7, 2007, for details about the general education categories and the criteria that will be used to evaluate courses proposed. The report is available at www.jtmorello.org/gened.

RATIONALE: Using only the space provided in the box below, **briefly** state why this course should be approved as a general education course in the category specified above. *Attach a course syllabus. Submit this form and attached syllabus electronically as one document to John Morello (jmorello@umw.edu).* All submissions **must** be in electronic form.

<p>This course—now in its second offering—provides an exploratory environment for the development of students' problem-solving and communication skills. Through a wide variety of mathematical problems, students discover for themselves standard techniques used by every mathematician. This course emphasizes collaboration and open discussion as a means of communicating ideas and solutions to problems. The effective communication of solutions is a focal point of this course just as it is in research mathematics. To that end, the students are responsible for writing complete, coherent analyses of the problems posed, as well as giving presentations on their work and leading the resulting discussions. Students are exposed to a broad range of problems from several classic sources, including <i>The Russian Experience</i> (Dmitri Fomin, et. al.) and <i>The Art and Craft of Problem Solving</i> (Paul Zeitz). With its emphasis on learning by discovery and collaboration and high standards in writing and speaking, this course serves well the intentions of the general education FSEM requirement.</p>
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FSEM 100: PIRATES, LIARS & PIGEONS
DR. RANDALL HELMSTUTLER
FALL 2007

Meeting Times: 11:00–11:50 MWF

Location: Trinkle B36

Readings: *How to Solve It* by George Polya, © 1945 Princeton University Press and *The Art and Craft of Problem Solving* by Paul Zeitz, 2nd ed., © 2007 Wiley.

Course Webpage: <http://people.umw.edu/~rhelmstu/classes/main.html>

Office: Trinkle 128

Phone: 654–1329

Email: rhelmstu@umw.edu

Personal Webpage: <http://people.umw.edu/~rhelmstu>

Office Hours: These may vary due to fluctuations in my own schedule. Up-to-date office hours may always be found on the course webpage. Appointments are more than welcome.

About the Course: This is a seminar course on problem solving techniques and the effective communication of ideas and solutions. In this seminar we will be focusing on the art—yes, *art*—of problem solving. Our approach will be mathematical, but with very little prior knowledge assumed. There are several common “tricks of the trade” that mathematicians always carry in their back pockets, and we will learn to use these strategies to attack a wide variety of interesting problems and puzzles. In a nutshell, this is a class about how to be clever. Our primary goal is to learn how to convey our ideas effectively, efficiently, and clearly, using mathematics as a venue in which to develop these skills. In true seminar style, there will be very little traditional lecturing, and the students are responsible for the content and momentum of the course. Throughout the semester students will develop

- a toolbox of ideas for attacking problems
- skills to participate in active, discussion-based, participatory learning
- the ability to read, speak, and write logical arguments using a variety of media
- methods to formulate meaningful questions and pose significant problems with various techniques of problem solving.

Grading: Your grade will be based on several criteria, including speaking and writing assignments and a final project. The relative weights of these components are given below:

Writing Assignments	25%
Speaking Assignments	25%
Participation	30%
Final Project	20%

The grading scale is the standard 10-point sliding scale, so a course grade of 90% guarantees an A–, an 80% guarantees a B–, etc.

Writing Assignments: There will be several formal writing projects over the course of the term, and all such assignments will be equally weighted. Each student will be required to type

detailed solutions—with complete explanations, arguments, and possibly graphics—for *at least two* problems. In addition, students will be required to complete a final project which will consist in part of a detailed written solution to a more involved problem.

Speaking Assignments: Students are in charge of presenting the solutions to the problems posed in the course. Each student is required to give formal presentations of the solutions for *at least two* problems. In the event we have enough time to consider more problems, students are still in charge of the presentations. In this case, any student with more than two presentations will have only their highest two scores contributing to this grade. In addition, an oral presentation of the final project results will be a major component of your final project grade.

Discussion & Participation: Since this is a seminar, participation and active discussion is integral to the success of the course. We will be struggling with problems every single day, and having everyone’s input will be crucial to our progress. As being present is a necessary component of participation, attendance will also factor into this portion of your course grade.

Final Projects: Students will work in small groups on presentations of more elaborate problems, including examples and open problems for the rest of the class to consider. These presentations and discussions are expected to be 20–25 minutes in duration and should have a “complete lesson” as the goal. Each talk should conclude with a few problems for the class to work on, and these problems will form the basis of a special discussion session held during our final exam period. Final project grades will be based on both the written and oral reports, the accuracy of the mathematical content, and the quality of the open problems posed.

Make-up/Extension Policy: All dates and deadlines are firm. Any adjustment must be requested beforehand, with one week’s notice whenever possible. An extension or make-up will be granted only for a legitimate reason. Otherwise, late work is never accepted. Because of the intricacy in scheduling class presentations, *there will be no extensions granted for the speaking assignments.*

Tentative Syllabus

Topic	Time
Parity	1 week
Pigeon Holes	2 weeks
Combinatorics	3 weeks
Induction	2 weeks
Graph Theory	3 weeks
Invariants	2 weeks
Final Presentations	2 weeks

NOTE: All times are approximate and depend strongly on the nature of our class discussions.