

## Sample Syllabi for the LMU 2-Semester Workshop Course in Mathematics

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Prerequisites: Precalculus background or concurrent enrollment in a precalculus course is required for the first semester of the course. Normally, students in the second semester would have completed or be concurrently enrolled in a calculus course.

Purpose: This course is intended to help develop the skills needed to excel as a mathematics major, to give a glimpse of modern mathematics and to provide information about career opportunities for mathematics majors.

Class Participation: Active participation in class discussions and problem solving in small groups is expected and is essential to getting the greatest benefit from this course.

Course Credit: The rule of thumb for courses at LMU is that for each unit of credit received, a student is to dedicate 2 - 3 hours outside of class to that course each week. This course carries 2 units of credit and so the student is expected to dedicate 4 - 6 hours each week outside of the classroom to this course.

Written Work: Each week at least one problem is assigned to work on and one problem solved in class is to be written up formally. Students are asked to revise each written solution until it meets our standards for good writing. Short reading assignments may be given. A biography assignment in the fall semester and an assignment to interview a faculty member in the spring semester include writing a short paper. Special class presentations or speakers are usually followed up by an assignment to answer several questions or to write a summary or reaction paragraph. A five to seven page paper and 15-minute talk on a mathematical topic is assigned during the fall semester and a poster paper presentation is assigned during the spring semester. Students are told to maintain a folder containing all written assignments for a portfolio assignment due at the end of each semester. For this assignment the student chooses several pieces of writing that show the scope of his or her improvement in writing mathematics and analyzes how these writing samples demonstrate improvement.

Grading: This course has four components: 1) Problem Solving, 2) Mathematical Writing, Verbal Communication and Study Skills, 3) Modern Mathematics and Mathematical Culture, and 4) Mathematical Careers and People. Each component counts equally towards the final grade. Completion of weekly problem solving and writing assignments and any requested re-writes, the papers mentioned above, class participation, and performance on the problem solving post-test are all considered.

Textbook: The textbook for this course is *Developing Successful Math Majors*, a manual written by Dewar, Larson and Zachariah in 2000 with support from the Los Angeles Collaborative for Teacher Excellence (NSF DUE 94-53608).

## First Semester Sample Syllabus for Developing Successful Math Majors

Week	Source*	Topics Covered
<i>*Developing Successful Math Majors by Dewar, Larson, &amp; Zachariah</i>		
1.		Introduction
	Appendix 3	Course surveys <sup>1</sup>
	§2.2.L	Problem Solving Pretest
	§2.2.C	Problem Solving: Understanding the Problem
	§5.5, [4]	Mathematical Careers: Video <i>Math, Who Needs It?</i>
2.	§3.6.A	Study Skills: Overview
	§2.2.B	Problem Solving: Breaking Mind Set
	§3.4.A-3.4.C	Writing Skills: How to Peer Review
3.	§3.2.A	Writing Skills: Examining Writing Samples
	§2.2.D	Problem Solving: Simplify the Problem
	§5.2.G	Mathematical Careers Discussion: Based on <i>Careers that</i>
<i>Count</i>	§3.6.B	Study Skills: Select and Practice a Skill
4.	§3.3.C	Writing Skills: English - Writing in Sentences
	§2.2.E	Problem Solving: Make a Model/Draw a Figure
	§5.2.I	Mathematical Career Speaker: Actuarial careers
5.	§4.4.B	Mathematical Culture: Video segment on Linear Perspective from <i>Life by the Numbers</i>
	§3.6.C	Study Skills: Self-Test
	§2.2.F	Problem Solving: Collect and Organize Data; Look for a Pattern
	§3.3.D	Writing Skills: Strike a Balance Between Words and Symbols
6.	§5.2.I	Mathematical People: Guest speaker gives a math autobiography
	§3.3.B	Writing Skills: Incorrect Math
	§2.2.G	Problem Solving: Work Backwards
7.	§3.3.A	Writing Skills: Common Errors
	§2.2.H	Problem Solving: Persistence
	§5.2.A	Mathematical People: Discussion of biographies of mathematicians
8.	§5.2.I	Mathematical Career Speaker: Secondary teaching careers
	§3.7, [17]	Problem Solving: The Candy Problem from <i>Math Horizons</i>
	§3.3.F	Writing Skills: Use Different Letters for Different Things

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<sup>1</sup> Course survey instruments to measure initial and/or final attitudes, confidence levels, and knowledge about problem solving approaches, study skills, mathematical careers and people are located in Appendix 3.

9.     §3.3.E     Writing Skills: Honor the Equal Sign  
        §2.2.I     Problem Solving: Another Approach  
        §4.4.D     Modern Mathematics: Presentation on Apportionment
10.    §5.2.I     Mathematical Culture Speaker: History of Calculus and Study  
                   Abroad opportunity  
        §2.4        Problem Solving: Cognitive Aspects  
        §4.4.E     Modern Mathematics: Presentation on Graph Theory
11.    §3.3.G     Writing Skills: Defining Terms  
        §2.2.J     Problem Solving: Look Back  
        §5.2.I     Study Skills Speaker: A senior math major gives advice
12.    §3.3.H     Writing Skills: Give Reasons  
        §2.2.K     Problem Solving: Putting It All Together  
        §5.2.C     Mathematical People: Video segment on Richard Tapia from  
                   *Breakthrough: Profiles of Scientists of Color*
13.    §3.3.F     Writing Skills: Using Different Letters for Different Things  
        §2.2.K     Problem Solving: Additional practice and discussion  
                   Study Skills: “Preparing for Finals” presentation by Learning  
                   Resource Center Math Specialist
14.    §3.3.O, 3.4.F Student Presentations of Math Papers
15.    Appendix 3    Course evaluations and course surveys  
        §2.2.L     Problem Solving Post-test  
                   Discussion of Problem Solving Post-test

## Second Semester Sample Syllabus for Developing Successful Math Majors

Week	Source	Topics Covered
1.	Appendix 3 §2.3.K §2.2.A, 2.3.A §3.2	Introduction Pre-course survey for new students Problem Solving Pre-test Problem Solving: Review of Polya's Four Steps Writing Skills: Review of writing skills discussed last semester
2.	§3.6.F §2.3.B §5.2.E §3.4A-3.4C	Study Skills: Making New Semester Resolutions Problem Solving: Draw a Diagram Mathematical Careers: Discussion based on information found on the Internet or in <i>Jobs Related Almanac</i> Writing Skills: Examining Writing Samples and Peer Review
3.	§3.6.D §3.3.S §5.2.I	Study Skills: Reading a Math Textbook (1) Problem Solving: Comparing Two Approaches to the Same Problem – Using Algebra vs. Drawing a Diagram Mathematical Career Speaker: NASA Astronaut
4.	§3.6.F §5.2.H §2.3.H §4.4.F	Study Skills: Review New Semester Resolutions Mathematical People: Choose student interview teams and corresponding faculty to interview Problem Solving: Inductive Approach Modern Mathematics: Presentation on the Mandelbrot Set and video <i>Nothing But Zooms</i>
5.	§3.6.E §2.3.H §3.3.P	Study Skills: Reading a Math Textbook (2) Problem Solving: Mathematical Induction Writing Skills: Introduce Poster Paper Assignment
6.	§3.3.M §5.2.H §2.3.F	Writing Skills: Writing in Other Courses Mathematical People: Discussion based on faculty interviews Problem Solving: Special Cases
7.	§3.3.I §2.3.G §5.5, [5]	Writing Skills: Watch Those Pronouns Problem Solving: Fewer Variables Mathematical Careers: Video and discussion - <i>Operations Research + You = Exciting Career</i>
8.	§2.3.E §3.3.J §5.2.I	Problem Solving: Break Down By Cases Writing Skills: Putting It All Together (1) Mathematical Culture and People Speaker: On women in the history of mathematics
9.	§2.3.D §4.4.C §4.4.A	Problem Solving: Pursue Parity Math Careers and People: Video about Florence Nightingale <i>The Passionate Statistician</i> Modern Mathematics: Discussion of GIMPS
10.	§5.2.I	Modern Mathematics Speaker: Biostatistics

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|     | §2.3.I       | Problem Solving: Contradiction  |
|     | §3.3.P       | Writing Skills: Meet students to discuss poster paper status                  |
| 11. | §3.3.K       | Writing Skills: Putting It all Together (2)                                   |
|     | §2.3.C       | Problem Solving: Pigeonhole Principle   |
|     | §5.5, [2]    | Mathematical People: Video about Polya <i>Let Us Teach</i><br><i>Guessing</i> |
| 12. | §3.3.L       | Writing Skills: Putting It all Together (3)                                   |
|     | §2.3.J       | Problem Solving: Putting It All Together                                      |
| 13. | §2.3.J       | Problem Solving: Additional practice and discussion                           |
|     | §4.6, [7]    | Modern Mathematics Speaker: Knot Theory and video <i>Not</i><br><i>Knots</i>  |
| 14. | §3.3P, 3.4.G | Student Poster Paper Presentations  |
| 15. | Appendix 3   | Course evaluations and course surveys   |
|     | §2.3.K       | Problem Solving Post-test   |
|     |              | Discussion of Problem Solving Post-test                                       |

