

Course Outline for MATH 3371, Math Modeling Seminar

MATH 3371 Math Modeling Seminar (2 units)

Prerequisite: Consent of Instructor

Directed group study of mathematical modeling techniques. Class members are expected to participate in the annual Mathematical Competition in Modeling. Credit/No Credit grading only. Repeatable up to 8 units. 2 seminars. Formerly MATH 371.

Course Learning Objectives	
1	Perform searches of the primary source literature for both mathematical and non-mathematical topics at a level appropriate for the Mathematical Contest in Modeling (MCM).
2	Design, implement, and analyze mathematical models for idealized real-world problems.
3	Present mathematical modeling results in written form at a professional level appropriate for the MCM.
4	Apply mathematical modeling and technical writing skills to successfully compete in the MCM.

Expanded Course Content

Textbooks, materials, and/or other resources
No required textbook. The website for the MCM has links to many useful resources including competition guides, mathematical modeling guides, writing guides, and the contest problems from previous years. Can be supplemented by additional readings supplied by the instructor from various sources, such as Gershenfeld, <i>Nature of Mathematical Modeling</i> (Cambridge Univ. Press, 1998) and Sauer, <i>Numerical Analysis</i> , 3rd ed. (Pearson, 2017).

Week	Readings	Topics of Discussion
1	MCM guides and other modeling guides on the MCM webpage; Instructor supplied reading.	Introductions to the MCM and mathematical modeling in general
2	Technical writing guides from academic journals. Literature search guides created by the Cal Poly library.	Introduction to technical writing and conducting primary source literature searches

Week	Readings	Topics of Discussion
3	Gershenfeld, Preface and Chapter 1	Types of mathematical models; examples of basic models including the SIR model for infectious diseases
4	Previous contest problems on MCM webpage	Mock MCM contest: initial model design; ongoing literature search
5 - 6	Primary source articles; technical writing and citation guides from academic journals.	Mock MCM contest: model formulation; ongoing literature search; initial technical writing
7 - 9	Selected excerpts from Sauer; instructor's notes	Mock MCM contest: model implementation; ongoing literature search as needed; technical writing of model formulation.
10 - 12	Instructor's notes; technical writing and modeling guides	Mock MCM contest: model analysis; ongoing literature search as needed; technical writing of analysis and results sections of final report; figure creation
13	Instructor's notes; technical writing and modeling guides	Mock MCM contest: strengths and weaknesses of model; technical writing – conclusions and summary (abstract);
14 - 15	Instructor's notes; technical writing and modeling guides	Mock MCM contest: further discussions of technical writing and model improvement.

Method of Assessment

The possible methods of assessment are written individual examinations, quizzes, in-class worksheets or presentations, projects, and homework.

Instructional Mode

The instructional mode for this class is face-to-face. This designation means that the essential academic standards of the course require in-class student engagement, and thus remote instruction is not appropriate.