

COURSE ANNOUNCEMENT

SPRING 2025

MAE 505 or APM 575

***Perturbation Methods in Applied
Mathematics***

Instructor: S. M. Baer

Time: 3:00 – 4:15 Tuesday & Thursday

Location: WXLRA-104

Schedule Line #: 22502 (MAE 505) or 22503 (APM 575)

Credits: 3

Course Description: This course is a comprehensive survey of techniques for solving singular perturbation problems. These problems arise in Engineering, Physics, Chemistry, and Biology, e.g., high or low-speed fluid flow, nonlinear oscillations, wave propagation, chemical reactions, excitable systems, delay, and stochastic differential equations. The methods of matched inner and outer asymptotic expansions, multiple scaling, and WKB will be emphasized. The goal of this course is to explore mathematical methods for obtaining approximate analytical solutions to differential equations that cannot be solved exactly and to develop insights and techniques useful for attacking new problems. An introduction to bifurcation analysis is included in this course.

Prerequisites: The course is intended for graduate students of Mathematics, Engineering, and Physics and junior/senior-level undergraduates with the consent of the instructor. If any questions, email steven.baer@asu.edu .

Textbook: *Introduction to Perturbation Methods*, M.H. Holmes