In calculus we learn techniques of integration and derive closed form exact solutions of differential equations. Later on we learn that closed form exact solutions are rare, but one can find approximate solutions using numerical methods or asymptotic analysis. Math 557 is an introduction to the techniques of asymptotic analysis commonly used in science and engineering. The topics include: asymptotic expansions, method of steepest descent, method of stationary phase, asymptotic evaluation of Fourier and Laplace transforms, WKB method, turning points, singular perturbations, method of multiple scales, matched asymptotic expansions, boundary layers, plus other topics as time permits. The main prerequisite is a course on complex variables (e.g. Math 555 or Math 596). Math 556 is not a prerequisite.

Grading Policy

Midterm Exam : Thursday, February 22, in class (20%)

Final Exam : Thursday, April 19, 4-6pm, room tba (40%)

Homework (40%)

Homework will be assigned every 2-3 weeks. Students may discuss the homework problems with each other, but each student should write up and submit their own solutions. Students may check their answers using symbolic software, but they should write up the derivations and make sure to understand them in case they appear on an exam.