Syllabus of MATH 256: Mathematics for Computational Science II

Instructor: Prof. Yongcheng Zhou

Office, email, and telephone: Weber 213; yongcheng.zhou@colostate.edu; 970-4910237

Please write to this email. Emails sent through Canvas may be not promptly replied.

Classroom and time

10:00-10:50AM on M, T, W, F in Military Sciences 115; Jan 16 - May 5

Office Hour:

9-10am Wednesday in Weber 213. Or by appointment.

Tentative Course Topics

- Review of Univariate Calculus and Linear Algebra
- Improper integrals and Probability Distributions
- Multivariate and Vector-valued functions
- Partial Derivatives, Gradients. Directional Derivatives
- Applications, Automatic Differentiation
- Multivariate Taylor series
- Multivariate Integration
- Lagrange Multipliers
- Surfaces and Manifolds
- Metric Spaces, Norms
- Applications

Learning Outcomes and Course Objectives

Upon successful completion, students will be able to:

- Describe functions in higher dimensional spaces.
- Calculate partial derivatives, Hessians, Jacobians and multivariate Taylor approximations.
- Describe and analyze geometric objects using methods from multidimensional calculus.
- Describe how to calculate multivariate integrals.
- Solve multidimensional optimization problems.
- Describe Manifolds and determine their properties.
- Determine properties of probability distributions.

Textbooks

Our lectures will be mostly based on

- Mathematics for Machine Leaning, by Deisenroth, Faisal, and Ong

Prerequisites

Calculus: MATH 156 or MATH 161

Linear algebra: DSCI 369 or MATH 369

Webpage

Homework assignments and other course information will all be posted on the course's Canvas page.

Exams and Grading

Course grades will be determined based on the following components:

- Homework (including programming) assignments: 40%
- Tuesday quizzes: 20% (peer to peer grading)
- Midterm: 20%
- Final exam: 20%

Your minimum grade will be A, B, C, or D, for a score of 90%, 80%, 70%, and 60% over the course of the semester, respectively.