

Fall 2024 MATH 417 (Section 1, CRN 67862)

Advanced Calculus I = Multivariable Calculus (with some theory & applications)

Class (Aug.19--Dec.06) Time & Room MWF 1:00--1:50pm, Engrg.E104

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Office Hours: MWF 2--3pm and by appointments

Textbook

P.D.Lax and M.S.Terell, "Multivariable Calculus with Applications", Springer, (2017), ISBN 978-3-319-74072-0;

[Epub and pdf files are available to CSU students \(Please check Libraries webpage\)](#)

Selected topics from other books

Course Contents

These includes mainly

- * (1) Vector algebra, Point-sets topology in higher dim spaces;
- * (1) Functions, Continuity, Extreme/Intermediate value theorems;
- * (1) Partial derivatives, Gradient, Jacobian matrix; Cartesian & polar/cylindrical/spherical coordinates; Tangent planes, Frenet vectors (TNB frame);
- * (1) Directional derivatives, Differentiable, Implicit/inverse function theorems;
- * (2) Higher order derivatives, Taylor expansion; Hessian matrix criterion for local extreme values;
- * (1) Grad/div/curl and applications
- * (2) Integration on domains, Iterated integrals;
- * (2) Integrals on curves and surfaces; Applications: Flux, work, rotation, etc.;
- * (2) Gauss/Stokes theorems & proofs, Re-visiting Green's formulas;
- * (1) Introduction to PDEs (Darcy, Maxwell, etc.);
- * (1) Differential forms; Review.

Homeworks (75%)

There will be **six (6)** regular homework assignments.

Team work on a part of each HW is allowed.

Final Exam (25%)

Wed. Dec.11, 2024, 4:10-6:10pm (Closed book/notes).

Bonus projects

-- TBA

Makeups

We follow the rules set by the University.

Letter Grades

A: 90+; B: 80-89; C: 70-79; D: 60-69; F: 59-

COVID

We follow the University policies.

Supplementary Reading

[1] S.R.Ghorpade and B.V.Limaye, "A Course in Multivariable Calculus and Analysis", Springer, (2010)

[2] S.J.Miklavcic, "An Illustrative Guide to Multivariate and Vector Calculus", Springer, (2020)

[3] D.Shimamoto, "Multivariable Calculus", (2019)

Last modified by J.Liu on Sat.2024/09/07