

ME281 - Methods of Tensor Calculus and Differential Geometry

CONDUCT OF COURSE

Instructor

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Teaching Assistant

There will be no teaching assistant for this course.

Course Website

<http://www.me.berkeley.edu/ME281>

Course Objectives

The course presents a modern introduction to differential geometry intended to promote a geometric view of mechanics. The target audience consists of graduate students with interest in engineering mechanics and physics.

Prerequisites

- Math 53 and Math 54 – Sophomore Mathematics.
- Some familiarity with continuum mechanics or intermediate dynamics.

Textbook and Reading Assignments

1. There is no required textbook.
2. Recommended references:
 - (a) **The Geometry of Physics: An Introduction**, by T. Frankel. Second edition. Cambridge University Press, New York, 2003.
 - (b) **Tensor Analysis on Manifolds**, by R.L. Bishop and S.I. Goldberg. Macmillan, New York, 1968 (reprinted by Dover Publications, 1980).

- (c) **Mathematical Foundations of Elasticity**, by J.E. Marsden and T.J.R. Hughes. Prentice-Hall, Englewood Cliffs, 1983 (reprinted by Dover Publications, 1994).
- (d) **Tensor Analysis, Theory and Applications to Geometry and Mechanics of Continua**, by I.S. Sokolnikoff, 2nd edition. Wiley, New York, 1964.

Homework

Homework will be assigned approximately every one to two weeks.

To simplify the task of grading, solutions should be submitted on $8\frac{1}{2} \times 11$ in engineering computation paper. Principal results must be clearly identified. Untidy solutions will not be accepted.

Examinations

There will be one $1\frac{1}{2}$ -hour in-class midterm examination and a take-home or in-class final examination.

Grading

Homework: 30%, midterm examination: 35%, take-home final examination: 35%.