MA 229 Jan 3:0

Calculus on Manifolds

Instructor

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Department: Mathematics

Course Time: MWF 3:00-4:00 PM

Lecture venue: Lecture Hall 4, Mathematics Department

Detailed Course Page: http://math.iisc.ac.in/all-courses/ma229.html

Announcements

Brief description of the course

This course is an introduction to Differential Geometry. It starts with the Inverse and Implicit function theorems, after discussing differential forms, the course ends with a proof of the Stoke's theorem.

Prerequisites

MA 221 Analysis I

Syllabus

Functions of several variables, Directional derivatives and continuity, total derivative, mean value theorem for differentiable functions, Taylorâ€™s formula. The inverse function and implicit function theorems, extreme of functions of several variables and Lagrange multipliers. Sardâ€™s theorem. Manifolds: Definitions and examples, vector fields and differential forms on manifolds, Stokes theorem.

Course outcomes

The student having seen basic analysis and linear algebra is expected to learn how these topics play a significant role, first in multi-variate calculus which then naturally leads to calculus on manifolds. The

intimate relationship between analysis and geometry should become apparent at the end of this course.

Grading policy

Assignment 10; Midterm 40; Final 50

Assignments

The students were asked to solve several problems from the prescribed text.

Resources

Spivak, M., Calculus on Manifolds ,W.A. Benjamin, co., 1965.

Hirsh, M.W., Differential Topology ,Springer-Verlag, 1997.