School of Mathematics

Module MA2322 — Calculus on manifolds   2011-12
(SF Mathematics, SF Theoretical Physics, JS & SS Two-subject Moderatorship)

Lecturer: Prof. David Simms

Requirements/prerequisites: prerequisite: MA2321

Duration: Hilary term, 11 weeks

Number of lectures per week: 3 lectures including tutorials per week

Assessment:

ECTS credits: 5

End-of-year Examination: This module will be examined jointly with MA2321 in a 3-hour examination in Trinity term, except that those taking just one of the two modules will have a 2 hour examination. However there will be separate results for MA2321 and MA2322.

Description: Integration of forms on surfaces/manifolds, Poincaré lemma, general Stokes theorem.

Learning Outcomes: On successful completion of this module, students will be able to:

- establish the properties of the exterior algebra (wedge product) of a finite dimensional real vector space

- establish the properties of the Hodge star operator for a finite dimensional oriented real vector space with a non-degenerate symmetric scalar product

- establish the properties of the differential of a differential form

- prove the Poincare lemma

- prove Stokes' theorem for a manifold with boundary

November 10, 2011