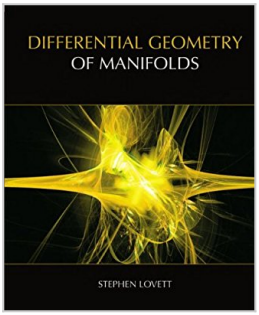

Differential Geometry of Manifolds

By Stephen T. Lovett

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From the coauthor of *Differential Geometry of Curves and Surfaces*, this companion book presents the extension of differential geometry from curves and surfaces to manifolds in general. It provides a broad introduction to the field of differentiable and Riemannian manifolds, tying together the classical and modern formulations. The three appendices provide background information on point set topology, calculus of variations, and multilinear algebra—topics that may not have been covered in the prerequisite courses of multivariable calculus and linear algebra.

Differential Geometry of Manifolds takes a practical approach, containing extensive exercises and focusing on applications of differential geometry in physics, including the Hamiltonian formulation of dynamics (with a view toward symplectic manifolds), the tensorial formulation of electromagnetism, some string theory, and some fundamental concepts in general relativity.

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Differential Geometry of Manifolds By Stephen T. Lovett Bibliography

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Editorial Review

Review

Differential Geometry of Curves and Surfaces and **Differential Geometry of Manifolds** will certainly be very useful for many students. A distinguishing feature of the books is that many of the basic notions, properties and results are illustrated by a great number of examples and figures. Each section includes numerous interesting exercises, which make these books ideal for self-study too. These books give a nice addition to the existing literature in the field of differential geometry of curves, surfaces, and manifolds. I strongly recommend them to anyone wishing to enter into the beautiful world of the differential geometry.
?Velichka Milousheva, *Journal of Geometry and Symmetry in Physics*, 2012

It provides a broad introduction to the field of differentiable and Riemannian manifolds, tying together the classical and modern formulations. … The book takes a practical approach, containing extensive exercises and focusing on applications of differential geometry in physics…
?*L'Enseignement Mathématique* (2) 57 (2011)

Lovett fills with this book a blatant gap in the vast collection of books on differential geometry. The book is easily accessible for students with a basic understanding of partial derivatives and a basic knowledge of vector spaces. …
it provides a thorough understanding of the most important concepts and thus opens the way for further studies, either in differential geometry (many references to other textbooks that go deeper into the subjects are included in the book) or in other research areas where differential geometry provides the language and tools to describe and solve the area's problems. An ample number of examples and exercises stimulate mastery in handling the tools introduced in the text.
The book is well suited for an introductory course in differential geometry, graduate students in mathematics or other sciences (physics, engineering, biology) who need to master the differential geometry of manifolds as a tool, or any mathematician who likes to read an inspiring book on the basic concepts of differential geometry.
?G. Paul Peters, *Mathematical Reviews*, Issue 2011k

Driven by the desire to generalize multivariate analysis to manifolds, the author guides the reader through the concepts of differential manifolds, their tangent spaces, vector fields, and differential forms and their integration. … The last chapter distinguishes this book from others in the field. It features applications of the mathematical theory to physics … Throughout the book, the introduction of a new notion is clearly motivated, relations to the classical theory are established, and notational conventions are explained. … This works very well … the book is self-contained to a high degree and suitable as textbook for a lecture or for self-study.
?H.-P. Schröcker, *International Mathematical News*, August 2011

Intended to provide a working understanding of the differential geometry of *n*-dimensional manifolds, it does a good deal more, offering treatments of analysis on manifolds (including the generalized Stokes's theorem) in addition to Riemannian geometry. An especially interesting chapter on applications to physics includes some general relativity, string theory, symplectic geometry, and Hamiltonian mechanics. … Highly recommended.
?S.J. Colley, *CHOICE*, February 2011

… the right book at the right time. … We live in an age when borders between mathematical disciplines (and even between parts of mathematics and parts of physics) are being re-drawn ? or erased altogether ? and differential geometry is a major player in all this Perestroika. Thus, the teaching of the subject to rookies should perhaps be restructured, too, at least in the sense of getting to the more avant garde stuff more quickly, and it looks like a major aim of Lovett's book is exactly that. … I think this is going to be a very successful textbook especially for rookie graduate students (and the zealous undergraduate would-be differential geometer, of course), as well as a very popular self-study source. It is a very nice book indeed. ?Michael Berg, Loyola Marymount University, Los Angeles, California, USA

About the Author
Stephen Lovett is an associate professor of mathematics at Wheaton College in Illinois. Lovett has also taught at Eastern Nazarene College and has taught introductory courses on differential geometry for many years. Lovett has traveled extensively and has given many talks over the past several years on differential and algebraic geometry, as well as cryptography.

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