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Nota di contenuto	Foreword -- Preface -- 1. Introduction -- 2. Cutoff and Other Special Smooth Functions on R^n -- 3. Algebras and Points -- 4. Smooth Manifolds (Algebraic Definition) -- 5. Charts and Atlases -- 6. Smooth Maps -- 7. Equivalence of Coordinate and Algebraic Definitions -- 8. Points, Spectra and Ghosts -- 9. The Differential Calculus as Part of Commutative Algebra -- 10. Symbols and the Hamiltonian Formalism -- 11. Smooth Bundles -- 12. Vector Bundles and Projective Modules -- 13. Localization -- 14. Differential 1-forms and Jets -- 15. Functors of the differential calculus and their representations -- 16. Cosymbols, Tensors, and Smoothness -- 17. Spencer Complexes and Differential Forms -- 18. The (co)chain complexes that come from the Spencer Sequence -- 19. Differential forms: classical and algebraic approach -- 20. Cohomology -- 21. Differential operators over graded algebras -- Afterword -- Appendix -- References -- Index.
Sommario/riassunto	This textbook demonstrates how differential calculus, smooth manifolds, and commutative algebra constitute a unified whole, despite having arisen at different times and under different circumstances. Motivating this synthesis is the mathematical formalization of the process of observation from classical physics. A broad audience will appreciate this unique approach for the insight it gives into the underlying connections between geometry, physics, and commutative algebra. The main objective of this book is to explain how differential

calculus is a natural part of commutative algebra. This is achieved by studying the corresponding algebras of smooth functions that result in a general construction of the differential calculus on various categories of modules over the given commutative algebra. It is shown in detail that the ordinary differential calculus and differential geometry on smooth manifolds turns out to be precisely the particular case that corresponds to the category of geometric modules over smooth algebras. This approach opens the way to numerous applications, ranging from delicate questions of algebraic geometry to the theory of elementary particles. Smooth Manifolds and Observables is intended for advanced undergraduates, graduate students, and researchers in mathematics and physics. This second edition adds ten new chapters to further develop the notion of differential calculus over commutative algebras, showing it to be a generalization of the differential calculus on smooth manifolds. Applications to diverse areas, such as symplectic manifolds, de Rham cohomology, and Poisson brackets are explored. Additional examples of the basic functors of the theory are presented alongside numerous new exercises, providing readers with many more opportunities to practice these concepts.