



## METADATA

**Title:** Elementary Differential Geometry

**Other Titles:** -

**Language:** Greek

**ISBN:** 978-960-603-016-1

**Subject:** MATHEMATICS AND COMPUTER SCIENCE

**Keywords:** Curve / Surface / Curvature / Gauss Map / Gauss Curvature

**Bibliographic Reference:** Arvanitogeorgos, A. (2015). Elementary Differential Geometry [Undergraduate textbook]. Kallipos, Open Academic Editions. <http://dx.doi.org/10.57713/kallipos-880>

### Abstract

The book is intended for undergraduate students and refers to classical differential geometry of curves and surfaces, i.e., differential geometry "according to Gauss." It will be written in such a way that, with appropriate emphasis on various topics by the instructor, it can be covered in a semester-long course. Very briefly, the content of the book will be as follows: The curvature and torsion of curves will be described, followed by a presentation of the theory of normal surfaces in Euclidean space  $\mathbb{R}^3$ . The terminology of maps will be

used in a gentle manner to prepare the reader for modern differential geometry. Next, the shape operator, Gaussian curvature, and the mean curvature of a normal surface will be defined. The approach will use basic linear algebra. The subtle issue of the commutative derivative and parallelism, as well as geodesic curves, will be discussed. Finally, there will be a brief presentation on minimal surfaces through change of variables, as well as a presentation of the connection between geometry and topology through the Gauss-Bonnet theorem.

