



SAPIENZA
UNIVERSITÀ DI ROMA

FACOLTÀ DI INGEGNERIA



GEOMETRIA DIFFERENZIALE

Corso di Laurea Magistrale in Ingegneria Meccanica

PROF. A. PRÁSTARO

A.A. 2011-2012

Synopsis - The main purpose is to allow the student to acquire some fundamental geometric differential methods for description and integration of partial differential equations (PDE's), that codify design in Mechanical Engineering. The main goal is to obtain a good operative level to handle PDE types interesting Mechanical Engineering.

PROGRAMME - Differential geometry of manifolds, surfaces and curves. Frenet formulas. Differential connections on fiber bundles and manifolds. Levi-Civita connection on Riemannian manifold.

Geometry of PDE's and characteristic vector fields. Smooth, singular and weak solutions of PDE's.

PDE's of Continuum Mechanics and their integration.

REFERENCES

- [1] A. Prástaro, *Geometry of PDE's and Mechanics*, World Scientific, USA, 1996. (Some sections in Chapter 2).
- [2] A. Prástaro, *Elementi di Meccanica Razionale*, Ed. 2010, Aracne, Roma 2010, viii+456 pp. (Chapter 2; Chapter 3; Some sections of Chapter 10 and Chapter 13).
- [3] F. W. Warner, *Foundations of Differential Manifolds and Lie Groups*, Glenview, Ill., 1971.
- [4] B. Spain, *Tensor calculus*, Oliver and Boyd, Edinburg and London. New York: Interscience Publishers, A Division of John Wiley & Sons, Inc., Edinburg 1965.

COURSE's HOMEPAGE 2011-2012.
