

# ICTP DIPLOMA PROGRAMME IN MATHEMATICS 2017-18

## Differential Geometry

C. Arezzo (20 lectures :30 hrs)

Part 1:

Local and global Theory of curves in space.

Curvature, Torsion and Frenet Formulae

Definition of surface in space.

Tangent vector fields, differentiable maps.

Gaus map. First and second fundamental form. Principal curvatures.

Gauss and mean curvatures.

Liebermann and Hilbert's Theorems.

From surfaces in space to 2-dimensional manifolds.

Part 2:

1) Definition and comments

2) Examples and vector bundles

3) Tensors

4) Covariant derivative

5) Levi-Civita Connection

6) Length and Energy of curves on a Riemannian manifold, Geodesics

7) Riemann Tensor and Sectional curvature