

ADMISSION TO DOCTORAL STUDIES Session September 2025

Field of doctoral studies: MATHEMATICS

Doctoral supervisor: Prof. Dr. Adela-Gabriela MIHAI

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: CONTRIBUTIONS TO THE GEOMETRY OF STATISTICAL MANIFOLDS

Contents / Main aspects to be considered:

- Riemannian and pseudo-Riemannian manifolds fundamental notions.
- Riemannian and pseudo-Riemannian submanifolds fundamental equations, fundamental theorems.
- Dual flat Riemannian structures.
- Exponential families of probability distributions.
- Affine differential geometry fundamental notions.
- Dual affine connections.
- Geometry of the statistical models.
- Statistical manifolds.
- Submanifolds in statistical manifolds.

Recommended bibliography:

- 1. M. do Carmo, *Riemannian Geometry*, Springer, 1992.
- B.-Y. Chen, *Pseudo-Riemannian Geometry*, δ-*Invariants and Applications*, World Scientific, 2011.
- 3. C. Udriste, O. Calin, *Geometric Modeling in Probability and Statistics*, Springer, Berlin, 2014.
- 4. S. Amari, *Differential-Geometric Methods in Statistics*, Springer, 1985.

- 5. S. Amari, *Information Geometry and Its Applications*, Springer, 2016.
- 6. A.-M. Li, Z. Hu, U. Simon, G. Zhao, *Global Affine Differential Geometry of Hypersurfaces*, De Gruyter, 2015.

Prerequisites / Remarks: *Basic notions on differential geometry, probability, statistics, mathematical analysis, linear algebra, differential equations are required.*

x Scientific Doctorate (full-time only)
□ Professional Doctorate (full-time or part-time)
x without tuition fee (state budget funded)
x with tuition fee or with funding from other sources than the state budget

Doctoral supervisor,

Prof. Dr. Adela-Gabriela MIHAI

Coordinator of the field of doctoral studies,

Prof. Dr. Radu PALTANEA

Signature

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