1. **Course:** Geostatistics Code: PPGEST0040 (2 credit hours)

   Period: 1° / 2025 Class Meetings: FRI 10:00 to 11:50 PM CIC/EST Building

   Prof. Alan Ricardo da Silva – Departamento de Estatística (EST)

2. **Course content:** The objective of this course is to present the main concepts of geostatistics, which seeks to describe the existing patterns in geographic data, thus providing a better understanding of the continuous phenomena. At the end of the course, the student will be able to better describe and interpret the phenomena that present spatial structure.

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3. **Program:**

   3.1 Surface analysis
   - 3.1.1 Basic concepts in spatial analysis
   - 3.1.2 Local deterministic models
   - 3.1.3 Trend Surfaces
   - 3.1.4 Geostatistics

   3.2 Kriging
   - 3.2.1 Simple Kriging
   - 3.2.2 Ordinary Kriging
   - 3.2.3 Universal Kriging
   - 3.2.4 Cokriging

4. **Bibliography:**

- Bailey, T. C.; Gatrell, A. C. (1995), *Interactive Spatial Data Analysis*, Prentice Hall, England.
- Chiles, J. P. & Delfiner, P. (1999). Geostatistics Modeling Spatial Uncertainty. John Wiley & Sons.
- Cressie, N. & Wikle, C. K. (1998). The variance-based cross-variogram: You can add apples and oranges. Mathematical Geology, 30(7):789-799.
- Cressie, N. A. C. (1991), *Statistics for Spatial Data*, Wiley, USA.
- Diggle, P.J.; Ribeiro Jr., P.J. (2007), *Model-based Geostatistics*, Springer, USA.
- Goovaerts, P. (1998). Ordinary cokriging revisited. Mathematical Geology, 30(1):21-42.
- Jian, X., Olea, R. A., & Yu, Y.-S. (1996). Semivariogram modeling by weighted least squares. Computers and Geosciences, 22:381-391.
- Myers, D. E. (1982). Matrix formulation of co-kriging. Mathematical Geology, 14(3):249-257.
- Rossiter, D. (2007). Technical note: Co-kriging with the gstat package of the r environment for statistical computing. Technical report, International Institute for Geo-information Science & Earth Observation.
- Stein, A. & Corsten, L. C. A. (1991). Universal kriging and cokriging as a regression procedure. Biometrics, 47(2):575-587.
- Silva, A. B. (2003), Sistemas de Informações Geo-referenciadas: Conceitos e Fundamentos. Ed. Unicamp.
- Webster, R. & Oliver, M. A. (2007). Geostatistics for Environmental Scientists, (2nd edition ed.). John Wiley & Sons, Ltd.

5. **Final Grade:**

   The students ' assessment will be made through 2 exams and 1 class project to be presented at the end of the semester. Final grade will be an arithmetic mean of the scores obtained from the 3 assessments.