Introduction to least squares adjustment and statistical methods

Professor	Email	Institution
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General Information

This course provides an introduction to statistical error modelling, estimation theory, linear and nonlinear least squares adjustment, with a review of certain numerical and statistical methods related to the mentioned subjects. Topics that the course considers include: sources and types of measurement errors, basic hypothesis of error theory, review of basics of linear algebra and univariate/multivariate statistics, error propagation, linear least-squares adjustment, constrained least-squares adjustment, nonlinear least-squares adjustment, numerical methods and considerations, examples of least-squares adjustment (e.g. triangulation and trilateration), principal component analysis, introduction to Monte Carlo methods and bootstrap.

Schedule

Dates	Description
May 16, 2023 14.00-16.00	Basics of statistics, estimation and statistical error characterization
May 30, 2023 14.00-16.00	Linear algebra review
June 6, 2023 14.00-16.00	Principal component analysis
June 13, 2023 14.00-16.00	Mathematical modeling, estimation examples, error propagation
June 20, 2023 14.00-16.00	Linear and conditional least squares adjustment
July 4, 2023 14.00-16.00	Nonlinear optimization and nonlinear least squares adjustment
July 11, 2023 14.00-16.00	Examples of LS adjustment: triangulation and trilateration
July 18, 2023 14.00-16.00	Monte Carlo methods and bootstrap
	Total 16 Hours - 8 Credits

Other information

The course will be delivered remotely. The link to join the online lectures will be sent to the registered participants. For any information www.indicee.unifi.it - dott-dicea@unifi.it

International Doctorate in Civil and Environmental Engineering