Course unit English denomination	Applied Multivariate Techniques
SS	STAT-01/A, STAT-01/B
Teacher in charge (if defined)	Livio Finos
Teaching Hours	20
Number of ECTS credits allocated	3
Course period	12/2025-02/2026
Course delivery method	☒ In presence ☐ Remotely ☐ Blended
Language of instruction	English
Mandatory attendance	☒ Yes (100% minimum of presence, apart from exceptional absences that must be justify in advance) ☐ No
Course unit contents	- Matrix decompositions and Dimensionality Reduction - Multidimensional Scaling and other dimensionality reduction methods - Modern multiple testing approaches - Univariate and Multivariate Permutation testing - Knockoff Methods, Split methods for post-selection inference - Conformal Inference - Summary and insight into further research directions
Learning goals	This course aims to equip students with the knowledge and skills to apply advanced multivariate statistical techniques in real-world data analysis scenarios. By the end of the course, students will be able to: - Understand and implement key matrix decompositions and dimensionality reduction methods for simplifying complex datasets. - Apply various techniques for visualizing and interpreting high-dimensional data, including multidimensional scaling and other modern dimensionality reduction methods. - Learn and apply modern multiple testing approaches, with a focus on controlling the false discovery proportion in high-dimensional settings.
Teaching methods	• Lectures • Laboratories
Course on transversal, interdisciplinary, transdisciplinary skills	☐ Yes ☒ No

Available for PhD students from other courses	☒ Yes ☐ No Students from other PhD courses may be admitted subject to CV evaluation and until the maximum number of students has been reached
Prerequisites (not mandatory)	max 3750 caratteri
Examination methods (in applicable)	None
Suggested readings	• Course material available from the instructor • Mardia, K. V., Kent, J. T., Bibby, J. M. (1979). Multivariate Analysis. Academic Press
Additional information	max 3750 caratteri