



Course unit English denomination	Applied Multivariate Techniques
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SS	STAT-01/A, STAT-01/B
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Teacher in charge (if defined)	Livio Finos
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Teaching Hours	20
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Number of ECTS credits allocated	3
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Course period	12/2026-02/2027
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Course delivery method	<input checked="" type="checkbox"/> In presence <input type="checkbox"/> Remotely <input type="checkbox"/> Blended
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Language of instruction	English
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Mandatory attendance	<input checked="" type="checkbox"/> Yes (100% minimum of presence, apart from exceptional absences that must be justify in advance) <input type="checkbox"/> No
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Course unit contents	<ul style="list-style-type: none">- 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
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Learning goals	<p>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:</p> <ul style="list-style-type: none">- 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.
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Teaching methods	<ul style="list-style-type: none">• Lectures• Laboratories
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Course on transversal, interdisciplinary, transdisciplinary skills	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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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)

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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
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Additional information

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