



Course unit English denomination	Applied Multivariate Techniques
Teacher in charge (if defined)	Livio Finos
Teaching Hours	20
Number of ECTS credits allocated	3
Course period	12/2024-02/2024
Course delivery method	<input checked="" type="checkbox"/> In presence <input type="checkbox"/> Remotely <input type="checkbox"/> Blended
Language of instruction	English
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
Course unit contents	<ul style="list-style-type: none"><li>- Matrix decompositions and Dimensionality Reduction</li><li>- Multidimensional Scaling and other dimensionality reduction methods</li><li>- Modern multiple testing approaches</li><li>- Univariate and Multivariate Permutation testing</li><li>- Knockoff Methods, Split methods for post-selection inference</li><li>- Conformal Inference</li><li>- Summary and insight into further research directions</li></ul>
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"><li>- Understand and implement key matrix decompositions and dimensionality reduction methods for simplifying complex datasets.</li><li>- Apply various techniques for visualizing and interpreting high-dimensional data, including multidimensional scaling and other modern dimensionality reduction methods.</li><li>- Learn and apply modern multiple testing approaches, with a focus on controlling the false discovery proportion in high-dimensional settings.</li></ul>
Teaching methods	<ul style="list-style-type: none"><li>• Lectures</li><li>• Laboratories</li></ul>
Course on transversal, interdisciplinary, transdisciplinary skills	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Available for PhD students from other courses	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Students from other PhD courses may be admitted subject to CV evaluation and until the maximum number of students has been reached



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Prerequisites  
(not mandatory)

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Examination  
methods  
(in applicable)                      None

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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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