

## SYLLABUS COURSE DESCRIPTION

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| <b>COURSE TITLE</b>                      | <b>Linear Algebra</b>  |
| <b>COURSE CODE</b>                       | 76238  |
| <b>SCIENTIFIC SECTOR</b>                 | MAT/02   |
| <b>DEGREE</b>                            | Bachelor in Computer Science   |
| <b>SEMESTER</b>                          | 1st  |
| <b>YEAR</b>                              | 1st  |
| <b>CREDITS</b>                           | 6  |
| <b>TOTAL LECTURING HOURS</b>             | 40   |
| <b>TOTAL LAB HOURS</b>                   | 20   |
| <b>ATTENDANCE</b>                        | Attendance is not compulsory, but non-attending students have to contact the lecturer at the start of the course to agree on the modalities of the independent study.  |
| <b>PREREQUISITES</b>                     | There are no prerequisites   |
| <b>COURSE PAGE</b>                       | <a href="https://ole.unibz.it/">https://ole.unibz.it/</a>  |
| <b>SPECIFIC EDUCATIONAL OBJECTIVES</b>   | <ul style="list-style-type: none"> <li>• Type of course: "di base" for L-31</li> <li>• Scientific area: "Formazione matematica-fisica" for L-31</li> </ul> <p>The aim of this course is to present a rather comprehensive treatment of linear algebra and its applications, giving a general overview of the field. It covers vector and matrix theory to some degree of mathematical logic and rigor, emphasizing topics useful in other disciplines such as solving linear equations and computing determinants and eigenvalues of matrices. The course also provides practice in using linear algebra to think about problems in computer science, and in actually using linear algebra computations to address these problems.</p> |
| <b>LECTURER</b>                          | <a href="#">Bruno Carpentieri</a>  |
| <b>SCIENTIFIC SECTOR OF THE LECTURER</b> | MAT/08   |
| <b>TEACHING LANGUAGE</b>                 | <b>Italian</b>   |

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| <b>OFFICE HOURS</b>           | Tuesday 16:00-18:00, Faculty of Computer Science, Piazza Domenicani 3, Office 3.10. <a href="mailto:Bruno.Carpentieri@unibz.it">Bruno.Carpentieri@unibz.it</a>  |
| <b>TEACHING ASSISTANT</b>     | <a href="#">Bruno Carpentieri</a><br><a href="#">Simone Ugolini</a>   |
| <b>OFFICE HOURS</b>           | Thursday 15:00-15:45, Faculty of Computer Science, Piazza Domenicani 3, Office 1.04, <a href="mailto:Simone.Ugolini@unibz.it">Simone.Ugolini@unibz.it</a>   |
| <b>LIST OF TOPICS COVERED</b> | <ul style="list-style-type: none"> <li>• Background on complex numbers, trigonometry and polynomials</li> <li>• Vectors and matrices</li> <li>• Linear Systems</li> <li>• Vector spaces</li> <li>• Linear operators</li> <li>• Spectral analysis</li> </ul> |
| <b>TEACHING FORMAT</b>        | This course will be delivered through a combination of frontal lectures and exercises   |

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| <b>LEARNING OUTCOMES</b> | <p><b>Knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>• Have a solid knowledge of linear algebra that are in support of computer science.</li> </ul> <p><b>Applying knowledge and understanding</b></p> <ul style="list-style-type: none"> <li>• Be able to use the tools of mathematics to solve problems.</li> </ul> <p><b>Making judgments</b></p> <ul style="list-style-type: none"> <li>• Be able to work autonomously according to the own level of knowledge and understanding</li> </ul> <p><b>Communication skills</b></p> <ul style="list-style-type: none"> <li>• Be able to use one of the three languages English, Italian and German, and be able to use technical terms and communication appropriately.</li> </ul> <p><b>Ability to learn</b></p> <ul style="list-style-type: none"> <li>• Have developed learning capabilities to pursue further studies with a high degree of autonomy.</li> </ul> |
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| <b>ASSESSMENT</b>          | <p>The written exam will consist of a set of verification questions, transfer of knowledge questions and exercises. The aim of the assessment is to check to which degree students have mastered the following learning outcomes:<br/>         1) knowledge and understanding,<br/>         2) applying knowledge and understanding,<br/>         3) making judgment.<br/>         The same rules apply to both attending and non-attending students.</p> |
| <b>ASSESSMENT LANGUAGE</b> | <b>Italian</b>  |

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| <b>EVALUATION CRITERIA AND CRITERIA FOR AWARDING MARKS</b> | <p>Final Written Exam, 100% covering the full program.</p> <p>Written exam questions will be evaluated in terms of correctness, clarity, quality of argumentation, problem solving ability.</p> <p>The same rules apply to both attending and non-attending students.</p> |
| <b>REQUIRED READINGS</b>                                   | <ul style="list-style-type: none"> <li>• Gilbert Strang: Introduction to Linear Algebra, Fourth Edition</li> <li>• Gilbert Strang: Algebra lineare (Italian)</li> <li>• Carl D. Meyer: Matrix Analysis and Applied Linear Algebra</li> </ul>                              |
| <b>SUPPLEMENTARY READINGS</b>                              | <ul style="list-style-type: none"> <li>• Philip N. Klein: Coding the Matrix Linear Algebra through Applications to Computer Science, First Edition.</li> </ul>  |
| <b>SOFTWARE USED</b>                                       | <p>No software is needed</p>  |