

# Applied Linear Algebra

Prof. Harald Wimmer<sup>1</sup>

<sup>1</sup>University of Würzburg, Germany  
Email: [wimmer@mathematik.uni-wuerzburg.de](mailto:wimmer@mathematik.uni-wuerzburg.de)

**Timetable:** 16 hours. Class meets on Tuesday (Room Ke) from 8:15 to 10:15 and Thursday (Room De) from 16:15 to 18:15. First lecture on Tuesday, March 13, 2012. Other lectures on March 15, 20, 22, 27, 29 and April 17, 19. Dept. of Information Engineering, Via Gradenigo 6/a.

**Course requirements:** A good working knowledge of basic notions of linear algebra, as e.g. presented in [1].

**Examination and grading:** Grading is based on homeworks or a written examination or both.

**Aim:** We study concepts and techniques of linear algebra, which are important for applications and computational issues. A wide range of exercises and problems will be presented such that a practical knowledge of tools and methods of linear algebra can be acquired.

**Course contents:**

- *Kronecker products*
- *Linear matrix equations (Sylvester equations, Lyapunov equations)*
- *Systems of linear difference and differential equations with applications (e.g. damped linear vibrations)*
- *Structured matrices (e.g. stochastic and doubly stochastic matrices)*

**References:**

- [1] E. Gregorio and L. Salce. *Algebra Lineare*. Edizioni Libreria Progetto, Padova, 2005.
- [2] A.J. Laub. *Matrix Analysis for Scientists and Engineers*, SIAM, Philadelphia, 2005,
- [3] C.D. Meyer. *Matrix Analysis and Applied Linear Algebra*, SIAM, Philadelphia, 2000.