Contents of the course ODEs and Applications

Master's Degree Program in Mathematics

A.Y. 2024/25

- 1. First-order linear differential equations
- 2. The Van Meegeren art forgeries
- 3. Separable equations
- 4. Population models
- 5. The spread of technological innovations
- 6. An atomic waste disposal problem
- 7. Orthogonal trajectories
- 8. Dynamics of tumour growth
- 9. Exact equations
- 10. The existence-uniqueness theorem
- 11. Picard iterations
- 12. Continuous dependence on the initial data and parameters
- 13. Algebraic properties of solutions of second order ODEs
- 14. Linear equations of second order with constant coefficients
- 15. Nonhomogeneous second order equations
- 16. The method of variation of parameters
- 17. Mechanical vibrations
- 18. The Tacoma Bridge disaster
- 19. Electrical networks
- 20. A model for the detection of diabetes

Suggested books: M. Braun, Differential Equations and Their Applications: An Introduction to Applied Mathematics (Texts in Applied Mathematics, Vol. 11), Springer (1992). C. D. Pagani e S. Salsa, Analisi Matematica vol. 2, Masson, (1993);