SYLLABUS
COURSE DESCRIPTION

COURSE TITLE	**Mathematical Methods for Experimental Sciences**
COURSE CODE	75005
SCIENTIFIC SECTOR	FIS/01
DEGREE	Bachelor in Computer Science and Engineering
SEMESTER	1st Semester
YEAR	2nd
CREDITS	8

TOTAL LECTURING HOURS	48
TOTAL LAB HOURS	24
PREREQUISITES	One-variable calculus (differentiation, integration)
COURSE PAGE	https://ole.unibz.it/

SPECIFIC EDUCATIONAL OBJECTIVES	• Type of course: “di base” for L-31 and L-08 • Scientific area: “formazione matematica-fisica” for L-31 and “fisica e chimica” for L-8 Learning how to tackle problems that require the maximization/minimization of a figure-of-merit function or the solution of differential equations. Learning the basics of Fourier transform analysis.

LECTURER	Leonardo Ricci
SCIENTIFIC SECTOR OF THE LECTURER	FIS/01 – Fisica Sperimentale
TEACHING LANGUAGE	English
OFFICE HOURS	TBA
TEACHING ASSISTANT	Same as lecturer
OFFICE HOURS	Same as lecturer
LIST OF TOPICS COVERED	• Integration • Differential equations • Functions of multiple variables • Differential and Taylor formula (for multiple variables) • Maxima and Minima • Function spaces • Series of functions • Systems of differential equations
TEACHING FORMAT	Frontal lectures; exercises

LEARNING OUTCOMES	**Knowledge and understanding** • have a solid knowledge of mathematics tools that are in support of computer science **Applying knowledge and understanding** • be able to use the tools of mathematics to solve problems **Making judgments** • be able to work autonomously according to the own level of knowledge **Communication skills** • be able to structure and write scientific documentation **Learning skills** • have developed learning capabilities to pursue further studies with a high degree of autonomy • be able to learn the innovative features of state-of-the-art technologies and information systems

ASSESSMENT	Written final exam only [100 % of mark]. The exam consists of 4-6 exercises: at least one exercise on differential calculus (see above the first 5 points of the syllabus), one exercise on differential equations and/or systems of differential equations, and one exercise on multiple integration.
ASSESSMENT LANGUAGE	English
EVALUATION CRITERIA AND CRITERIA FOR AWARDING MARKS	Relevant for assessment are: correctness of answers; clarity of answers.

REQUIRED READINGS	Textbook: • R. A. Adams and C. Essex, "Calculus – a complete course", Pearson Canada Other reading suggestions: excerpts from (for example) • T. M. Apostol, "Calculus, Vol. 2: Multi-Variable Calculus and Linear Algebra with Applications to Differential Equations and Probability", Wiley • F. Conti, P. Acquistapace, A. Savojni, "Analisi matematica – Teoria e applicazioni", McGraw-Hill • W. H. Press, B. P. Flannery, S. A. Teukolsky, W. T. Vetterling, "Numerical Recipes in C: The Art of Scientific Computing", Cambridge University Press; available online at *www.nr.com*
SUPPLEMENTARY READINGS	none
SOFTWARE USED	Occasionally, *gnuplot* on Linux