



UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

NUMERICAL METHODS IN ENGINEERING SCIENCES

Anno immatricolazione	2021/2022
Anno offerta	2021/2022
Normativa	DM270
SSD	MAT/08 (ANALISI NUMERICA)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	INDUSTRIAL AUTOMATION ENGINEERING - INGEGNERIA DELL'AUTOMAZIONE INDUSTRIALE
Curriculum	PERCORSO COMUNE
Anno di corso	1°
Periodo didattico	Primo Semestre (27/09/2021 - 21/01/2022)
Crediti	6
Ore	46 ore di attività frontale
Lingua insegnamento	English
Tipo esame	SCRITTO E ORALE CONGIUNTI
Docente	SANGALLI GIANCARLO (titolare) - 6 CFU
Prerequisiti	Differential and integral calculus for real functions; complex numbers; linear algebra; computer programming experience.
Obiettivi formativi	The aim of the course is to enable students to classify real-life problems and choose the best suited algorithms for solving them, in terms of costs/benefits and convergence properties. At the same time, the course is meant to make students well acquainted with the use of Matlab software and with the practical implementation of some algorithms.
Programma e contenuti	* Numerical solution of ordinary differential equations. *Solution of linear systems of equations: direct and iterative methods.

	*Nonlinear equations: bisection and Newton's methods. Convergence, order of convergence, stopping criteria. *Lagrange interpolation: interpolation error, piecewise Lagrange interpolation, order of approximation. *Least squares method for data fitting: linear regression and various examples. *Interpolatory quadrature formulas in 1D: midpoint, trapezoidal, Simpson and error analysis. Gaussian formulae.
Metodi didattici	Lessons and computer lab practice
Testi di riferimento	Teacher' slides. For more material see: A. Quarteroni, R. Sacco, F. Saleri . Numerical Mathematics-2nd edition. Springer Series: Texts in Applied Mathematics, Vol. 37 (2007).
Modalità verifica apprendimento	The exam will be written. Each student will be offered a couple of questions on subjects developed in the classes and has one hour to answer.
Altre informazioni	Additional information can be found on the web page: http://www-dimat.unipv.it/sangalli
Obiettivi Agenda 2030 per lo sviluppo sostenibile	<u>\$lbl_legenda_sviluppo_sostenibile</u>