Syllabus Attività Formativa

Anno Offerta	2025
Corso di Studio	LM25F - ECONOMIA E FINANZA
Regolamento Didattico	LM25F-25
Percorso di Studio	LM25EFIRM - ROME
Insegnamento/Modulo	RM432 - MATHEMATICAL METHODS FOR ECONOMICS - MATHEMATICAL METHODS FOR ECONOMICS
Attività Formativa Integrata	-
Partizione Studenti	-
Periodo Didattico	S1 - Primo Semestre
Sede	
Anno Corso	1
Settore	SECS-S/06 - METODI MATEMATICI DELL'ECONOMIA E DELLE SCIENZE ATTUARIALI E FINANZIARIE
Tipo attività Formativa	B - Caratterizzante
Ambito	84242 - Discipline Statistiche e Matematiche
CFU	8.0
Ore Attività Frontali	72.0
AF_ID	168555

Tipo Testo	Codice Tipo Testo	Num. Max. Caratteri	Obbl.	Testo in Italiano	Testo in Inglese
Obiettivi formativi	OBIETT_FORM	3800	No		1) To learn some basic methods in Linear Algebra, Linear and Nonlinear Dynamical

/Instructional goals					Systems, Optimization. These are essential tools to understand and develop mathematical models in economics. 2)To be able to understand mathematical models and to develop them in simple cases
Prerequisiti / Prerequisites	PREREQ	3800	Sì		All basic mathematics courses of Laurea Triennale in Economics and similar topics. In particular: - Calculus for one variable functions (basic topology, functions and their properties, limits derivatives and their connection with monotonicity and convexity, integrals, graph of functions); - Searching extremals and zeros for one-variable functions using the appropriate theorems; - Basic linear algebra concepts (vector spaces and their bases, linear dependence and independence of vectors, matrices, rank, determinant, linear systems, Rouché-Capelli Theorem) - Basic calculus for several variables: topology in R^n, limits, continuity, differentiability, gradient and its properties (this part will be briefly reviewed in the first lectures)

Risultati di apprendimento attesi/Intended learning outcomes	RIS_APPREND	3800	Sì		1) Knowledge and understanding: The course will offer the basic theoretical tools of Linear Algebra, Dynamical Systems, Optimization. These are key tools to understand and develop mathematical models in economics. 2) Applying knowledge and understanding: The students will be taught how to use the above basic tools to develop simple mathematical models of real phenomena such as: - population and investment dynamics; - climate change; - ranking of web pages; - economic dynamics; 3) Making judgements: We expect students to be able to - understand the main mathematical features of basic economic models; - judge the reliability of information on quantitative modeling that they read in the press; - build simple mathematical models of real phenomena.

					4) Communications Skills: This course will give the students the possibility to acquire and understand major terms and concepts in order to communicate their ideas, proposals, analysis and critical reasoning in the field of mathematical modeling in the most effective and appropriate way. 5) Learning skills: This course will contribute to empower learners giving them the tools to evaluate the statements on quantitative mathematical modeling (that they can read in the press or in specialized journals) in an independent way.
Contenuti Del Corso / Course Contents	CONTENUTI	3800	Sì		- Review of calculus of Several Variables - Implicit Functions and Comparative Statics - Unconstrained Optimizazion - Constrained Optimization - Eigenvalues and eigenvectors, - Spectral decomposition - Linear/Nonlinear Difference/Differential Equations and Systems - Use of the above techniques to build mathematical models of real phenomena.

Testi Di Riferimento / Reference Books	TESTI_RIF	3800	Sì		1) MATEMATICS FOR ECONOMISTS Carl Simon e Lawrence Blume W.W. NORTON & COMPANY. 2) Notes given by the teacher.
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 1 / Extended Program And Reference Reading Material: Week 1	PROGR_LEZ_1_1	3800	Sì		- Eigenvalues and eigenvectors 1
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 2 / Extended Program And Reference Reading	PROGR_LEZ_1_2	3800	Sì		Eigenvalues and eigenvectors 2

Material: Week 2					
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 3 / Extended Program And Reference Reading Material: Week 3	PROGR_LEZ_1_3	3800	Sì		Eigenvalues and eigenvectors 3
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 4 / Extended Program And Reference Reading Material: Week 4	PROGR_LEZ_1_4	3800	Sì		- Linear Difference/Differential Equations and Systems 1
Programma Esteso E	PROGR_LEZ_1_5	3800	Sì		- Linear Difference/Differential Equations and Systems 2

Materiale Didattico Di Riferimento: Settimana 5 / Extended Program And Reference Reading Material: Week 5					
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 6 / Extended Program And Reference Reading Material: Week 6	PROGR_LEZ_1_6	3800	Sì		- Linear Difference/Differential Equations and Systems 3
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 7 / Extended	PROGR_LEZ_1_7	3800	Sì		- Nonlinear Difference/Differential Equations and Systems

Program And Reference Reading Material: Week 7					
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 8 / Extended Program And Reference Reading Material: Week 8	PROGR_LEZ_1_8	3800	Sì		- Calculus of Several variables; recap. - Implicit Functions and Comparative Statics
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 9 / Extended Program And Reference Reading	PROGR_LEZ_1_9	3800	Sì		- Unconstrained Optimizazion

Material: Week 9					
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 10 / Extended Program And Reference Reading Material: Week 10	PROGR_LEZ_1_10	3800	Sì		- Constrained Optimization 1
Programma Esteso E Materiale Didattico Di Riferimento: Settimana 11 / Extended Program And Reference Reading Material: Week 11	PROGR_LEZ_1_11	3800	Sì		- Constrained Optimization 2
Programma Esteso E	PROGR_LEZ_1_12	3800	Sì		- Dynamic Optimization

Materiale Didattico Di Riferimento: Settimana 12 / Extended Program And Reference Reading Material: Week 12					
Metodologie Didattiche / Teaching Methods	METODI_DID	3800	Sì		Lessons and Exercises sessions. “Teaching is not transferring knowledge, but creating the conditions for its production or construction”
Modalità di verifica dell'apprendimento / Assessment Method	MOD_VER_APPR	3800	Sì		100% final exam: written
Criteri per l’assegnazione dell’elaborato finale/ Thesis assignment criteria	CRIT_ASS_ELA	3800	Sì		Interview