Syllabus Attività Formativa

Anno Offerta	2020
Corso di Studio	SM34 - MATEMATICA
Regolamento Didattico	SM34-18-19
Percorso di Studio	PDS0-2018 - comune
Insegnamento/Modulo	525SM - TOPICS IN ADVANCED ANALYSIS 2 - TOPICS IN ADVANCED ANALYSIS 2
Attività Formativa Integrata	-
Partizione Studenti	-
Periodo Didattico	S1 - Primo Semestre
Sede	TRIESTE
Anno Corso	2
Settore	MAT/05 - ANALISI MATEMATICA
Tipo attività Formativa	C - Affine/Integrativa
Ambito	20947 - Attività formative affini o integrative
CFU	6.0
Ore Attività Frontali	48.0
AF_ID	271880

Tipo Testo	Codice Tipo Testo	Num. Max. Caratteri	Obbl.	Testo in Italiano	Testo in Inglese
Lingua insegnamento	LINGUA_INS	3800	Sì	English	English

Contenuti (Dipl.Sup.)	CONTENUTI	3800	Sì	The course considers advanced topics in partial differential equations. After an introductory part focused on harmonic analysis, the course introduces various equations, such as Navier Stokes and nonlinear Schroedinger, and looks at the initial value problem. Preliminaries. Riesz 's Interpolation Theorem and some applications. Maximal function . Marcinkiewicz Interpolation Theorem. Theorem by Hardy Sobolev Littlewood. Sobolev's Embedding for homogenous spaces in R^n). Inequality of Gagliardo Nirenberg. Bochner Integral. Stokes Equation . Weak solutions, uniqueness, energy identity. Incompressible Navier Stokes Equations. Weak solutions. Leray 's Theorem on global existece of weak solutions in dimensions 2 and 3. Well posedness in Sobolev spaces. Leray 's Thorem of the uniqueness, well posedness in 2D. In the 2nd part of the course we will continue to focus on Incompressible Navier Stokes Equations discussing theory by Caffarelli Kohn and Nirenberg, using the book by Robinson,Rodrigo and Sadowsky	The course considers advanced topics in partial differential equations. After an introductory part focused on harmonic analysis, the course introduces various equations, such as Navier Stokes and nonlinear Schroedinger, and looks at the initial value problem. Preliminaries. Riesz 's Interpolation Theorem and some applications. Maximal function . Marcinkiewicz Interpolation Theorem. Theorem by Hardy Sobolev Littlewood. Sobolev's Embedding for homogenous spaces in R^n). Inequality of Gagliardo Nirenberg. Bochner Integral. Stokes Equation . Weak solutions, uniqueness, energy identity. Incompressible Navier Stokes Equations. Weak solutions. Leray 's Theorem on global existece of weak solutions in dimensions 2 and 3. Well posedness in Sobolev spaces. Leray 's Thorem of the uniqueness, well posedness in 2D. In the 2nd part of the course we will continue to focus on Incompressible Navier Stokes Equations discussing theory by Caffarelli Kohn and Nirenberg, using the book by Robinson,Rodrigo and Sadowsky

Testi di riferimento	TESTI_RIF	3800	Sì	Along with some instructor's notes, we will use the following bibliography 1) Bahouri, Chemin, Danchin: Fourier analysis and nonlinear partial differential equations. Springer 2) Cazenave, Haraux: An introduction to semilinear evolution equations. Oxford Univ.Press. 3) Chemin, Desjardins, Gallagher, Grenier: Mathematical Geophisics. Oxford Univ.Press. 5) Robinson, Rodrigo, Sadowski: The three dimensional Navier Stokes Equations, Cambridge Univ. Press. 6) Stein: Singular Integrals and Differentiability Properties of Functions. Princeton University Press. 7) Stein: analysis: real-variable methods, orthogonality, and oscillatory integrals. Princeton University Press.	Along with some instructor's notes, we will use the following bibliography 1) Bahouri, Chemin, Danchin: Fourier analysis and nonlinear partial differential equations. Springer 2) Cazenave, Haraux: An introduction to semilinear evolution equations. Oxford Univ.Press. 3) Chemin, Desjardins, Gallagher, Grenier: Mathematical Geophisics. Oxford Univ.Press. 5) Robinson, Rodrigo, Sadowski: The three dimensional Navier Stokes Equations, Cambridge Univ. Press. 6) Stein: Singular Integrals and Differentiability Properties of Functions. Princeton University Press. 7) Stein: analysis: real-variable methods, orthogonality, and oscillatory integrals. Princeton University Press.
Obiettivi formativi	OBIETT_FORM	3800	Sì	The purpose of the course is to introduce the students to the topic of (mainly nonlinear) partial differential equations showing on few paradigmatic examples how they can be treated thinking of them as ordinary differential equations in an infinite dimensional setting, using tools of functional analysis and of harmonic analysis. The course is very advanced, and should be taken only by	The purpose of the course is to introduce the students to the topic of (mainly nonlinear) partial differential equations showing on few paradigmatic examples how they can be treated thinking of them as ordinary differential equations in an infinite dimensional setting, using tools of functional analysis and of harmonic analysis. The course is very advanced, and should be taken only by

				students with a strong background in functional analysis.	students with a strong background in functional analysis.
Prerequisiti	PREREQ	3800	Sì	Functional analysis, specifically Sobolev spaces and, broadly speaking, the topics of the 1st year courses ADVANCED ANALYSIS parts A e B.	Functional analysis, specifically Sobolev spaces and, broadly speaking, the topics of the 1st year courses ADVANCED ANALYSIS parts A e B.
Metodi didattici	METODI_DID	3800	Sì	The course consists of lectures during which the Instructor discusses all the details of the topics covered, answers student's questions and tries to get them involved. The students will receive before the lectures the lecture notes of the Instructor.	The course consists of lectures during which the Instructor discusses all the details of the topics covered, answers student's questions and tries to get them involved. The students will receive before the lectures the lecture notes of the Instructor.
Altre informazioni	ALTRO	3800	Sì	The lecture notes and other information will be available through Moodle	The lecture notes and other information will be available through Moodle
Modalità di verifica dell'apprendimento	MOD_VER_APPR	3800	Sì	The exam consists of a student seminar of about 30 minutes on a topic arranged with the Instructor, during which the student will show whether or not is able to apply the main ideas presented during the lectures by the Instructor in specific and analogous contexts. The Instructor might ask some questions on the topics covered during the course in class.	The exam consists of a student seminar of about 30 minutes on a topic arranged with the Instructor, during which the student will show whether or not is able to apply the main ideas presented during the lectures by the Instructor in specific and analogous contexts. The Instructor might ask some questions on the topics covered during the course in class.
Programma esteso	PROGR_EST	3800	Sì	.	.