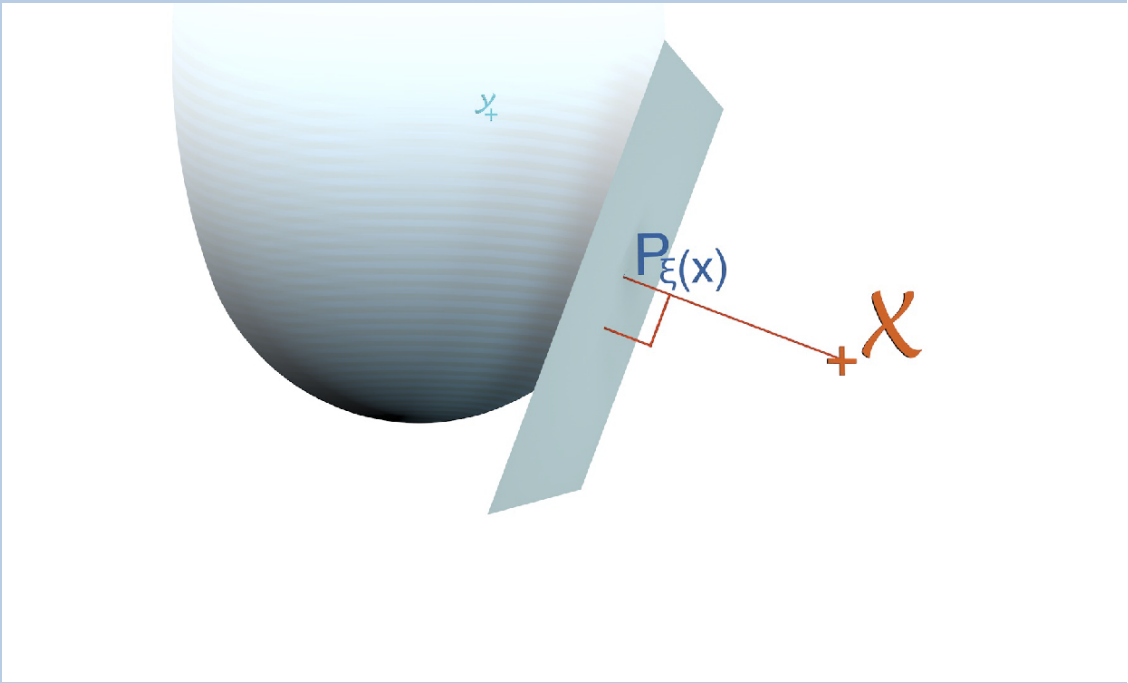
European Virtual Exchange

Sorbonne Université	**Basic functional analysis (4M105)**			
Course description	The course covers basic functional analysis in its own right together with an orientation towards applications to partial differential equations.			
Domain	Mathematics			
Keywords	Functional analysis	topology	Metric spaces	Banach spaces
Prerequisites	Linear algebra and topology of the third year of Bachelor's degree are imperative.			
Level	Master 1			
Language	English			
Number of credits and workload	**6 credits**	**10 hrs per week**		**60 hrs in total**
Semester period and Start date course	**Semester** 1	**Start date**: 3-Sep-18 Or indicate a period.		
Application deadline	3-Sep-18			
Full course description	In the first chapter, we show basic results on the topology of metric spaces, including the notions of complete metric spaces and compact metric spaces. A solid mastery of the contents of this chapter is absolutely imperative. The second chapter deals with the study of normed vector spaces, fundamental examples of which are function spaces. A key point here is understanding the effects of working in infinite dimension (which is the case in function spaces) on topology. Ascoli's theorem, a compactness criterion for parts of continuous function spaces, illustrates the difficulties which appear in infinite dimension frameworks. The third chapter deals with the notion of duality. It may be short, but it is fundamental. Duality is the basis of the theory of distributions, a major breakthrough in analysis at the start of the XXth century - this will be studied in chapter 8. Beyond the concept of transposes of linear maps, this chapter explains the procedure which allows one to identify the dual of a Banach space - another Banach space with a weaker notion of convergence, induced by the fact that it is a dual space, that we call "weak-star convergence". The fourth chapter is a classic: Hilbert spaces, which extend the notion of Euclidean spaces to infinite dimension.			
Platform and link to course description	Moodle Sciences	https://moodle-sciences.upmc.fr		
Course description in study guide	https://www.ljll.math.upmc.fr/chemin/cours/4M005.html			
Lecturer(s)	Jean-Yves Chemin			
Extra Course information	Information relevant for selection process or for students			

Picture of course	

Final examination date and time /period	Examination date	Examination time UTC + or -	7-12 January 2019
Examination registration deadline or drop-out deadline	Examination registration before If applicable, enter examination registration date. NO Drop- out deadline If applicable, enter last drop-out date. NO		
Type of examination	Written		
Midterm examination?	☐ **yes** ☒ **no**	Additional information on midterm exam	
Previous exam papers available	☐**yes** ☒ **no**		
Specific rules for examinations	Give details if particular rules apply like no use of calculator, watches etc		
Resit? and date	☒ **yes** ☐**no**	Enter resit date. 11-17 June	
Grade release and transcript release	January	Transcript release date if more than 1 week after grade release.	

Avalaible places	**60** equally distributed to the partners	
	Interested	**10 places per university**
UC Louvain	☐ **yes**	Click or tap here to enter number
EPFL	☐ **yes**	Click or tap here to enter number
UC3M	☐ **yes**	Click or tap here to enter number
Leiden	☐ **yes**	Click or tap here to enter number
Wageningen	☐ **yes**	Click or tap here to enter number
TU Delft	☐ **yes**	Click or tap here to enter number

General information	Sorbonne Université
Date start academic year:	3-Sep-18
Semester periods:	**1st from** 3-Sep-18 **to** 21-Dec-18 Additional information on semester 1 **2nd from** 21-Jan-19 **to** 11-May-19 Additional information on semester 2
Application deadline semester 1:	3-Sep-18 or enter text
Application deadline semester 2:	21-Jan-19 or enter text
Holiday periods:	27.10.2018 to 04.11.2018 22.12.2018 to 06.01.2018 20.04.2019 to 05.05.2018
Student data required for application:	First and last name, email address, study level, home university
General web site	https://www.sorbonne-universite.fr/
Virtual Exchange web site	http://www.telesciences.upmc.fr/fr/european-virtual-exchange.html
Virtual Exchange contact person(s) operational	Sabine Bottin-Rousseau
Virtual Exchange Email address	bottin@insp.jussieu.fr
List of courses available per semester	1st semester: Introduction à la mécanique (BA 1) Calculus (BA 1) Si on parlait sciences (BA 1) Thermodynamics (BA 3) Introduction to Quantum Mechanics(BA3) Concurrent Programming(Bachelor 3) Bases of functional analysis 1 and 2 (Master 1) Programming on mobile platform IOS (Master 2) 2nd semester: Calcul matriciel (BA 1) Systèmes mécaniques et systèmes électroniques (BA 1)