UCLouvain	lmat2330 2022	Seminar on the teaching of mathematics

4.00 credits	15.0 h + 30.0 h	Q1 and Q2

Teacher(s)	Vitale Enrico ;
Language :	French
Place of the course	Louvain-la-Neuve
Prerequisites	Mathematical skillsat the level corresponding to the first year of the bachelor in mathematics. Language skills : French (written and spoken) at high school level.
Main themes	Important and sensitive parts of the mathematics programme in the last three years of secondary school.
Learning outcomes	**At the end of this learning unit, the student is able to :**

	1 Contribution of the course to learning outcomes in the Master in Mathematics program. By the end of this activity, students will have made progress in:
	 - Master the disciplinary knowledge and basic transferable skills whose acquisition began in the Bachelor program.
	    In particular, he will develop his ability to:
	     -- Choose and use the fundamental methods and tools of calculation to solve mathematical problems.
	     -- Recognise the fundamental concepts of important current mathematical theories.
	     -- Establish the main connections between these theories.
	 - Show evidence of abstract thinking and of a critical spirit.
	    He will develop his ability to:
	     -- Argue within the context of the axiomatic method.
	     -- Construct a proof independently, clearly and rigorously.
	 - Communicate in a scientific manner.
	    He will develop his ability to:
	     -- Structure an oral presentation and adapt it to the level of expertise of the audience.
	 - Assume a professional role in the teaching at high school, exploiting his personal pedagogical and mathematical skills.
	 Learning outcomes specific to the course. By the end of this activity, students will be able to:
	 - Comparing and integrate possible different approaches to the main subjects in the secondary school mathematics program, and evaluating their mathematical and didactic relevance.
	 - Identifying the key steps and sensitive points in the secondary school mathematics program.
	 - Relate the mathematical contents of the secondary education program to those of university training to use the skills acquired in disciplinary courses.
	 - Suggesting problems that allow for the introduction, illustration and employment of the program's mathematical concepts.
	 - Recognising the aims of the secondary school teaching program inorder to organise a course in the light of these objectives.

Evaluation methods	Student assessment is based on the two presentations given in the context of the seminar (both mathematical and didactic aspects will be taken into account), on participation in discussions, and on the quality of contributions in the context of the placement.

Teaching methods	Every seminar session is held over two parts. - During the first part (one hour), a student presents a sequence of classes dealing with a given topic, with lesson plan, reasons, theory, examples. The student speaks to the other students and teachers as if facing an audience of secondary school pupils. During the presentation everyone may ask questions regarding immediate understanding (like pupils) but they make not make more extensive comments. Students must identify the essential points and sections that are difficult to teach. The presentation must not be a reproduction of the student's secondary class, but must be based on the skills acquired in the basic Baccalaureate classes. - During the second part (one hour), all students and teachers comment on: -- the mathematics presented (correction of any possible errors, important omissions) -- the clarity of the presentation (structured presentation, use of correct words, grading, oral clarity, management of board) -- balance between intuition, motivation and class dynamism (stimulating discovery, challenging aspect of certain problems) on the one hand and, on the other hand, sufficient rigour -- choices: choice or presentation type (there is no single choice, and so, if this is the case, identifying the various possible presentations as well as their advantage and disadvantages), choice of examples, choice of points to highlight.
Content	The following arguments are discussed during the seminar. - Limits of functions and continuous functions. - Derivatives of a function (theory and applications). - Integrals and the fundamental theorem of integral calculus. - The exponential and logarithmic functions. The trigonometric functions. Real and complex number systems. - Systems of linear equations, matrix operations, determinant. - Geometry (vecteurs in R^2 and R^3). - Analytic geometry in R^3.
Inline resources	Moodle Website under construction.
Bibliography	• Manuels Actimath, Espace Math et CQFD de cinquième et sixième, à disposition des étudiants au secrétariat de l'école de mathématique. • Syllabus de BAC 1 et programmes des cours de mathématique de la SEGEC (deuxième et troisième degré général), à disposition des étudiants sur le site Moodle du cours.
Faculty or entity in charge	CAFC

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Teacher Training Certificate (upper secondary education) - Mathematics	MATH2A	4		🔍
Teacher Training Certificate (upper secondary education) - Physics	PHYS2A	4		🔍
Master [120] in Biology of Organisms and Ecology	BOE2M	4		🔍
Master [120] in Biochemistry and Molecular and Cell Biology	BBMC2M	4		🔍
Teacher Training Certificate (upper secondary education) - Biology	BIOL2A	4		🔍
Master [120] in Mathematics	MATH2M	4		🔍
Master [120] in Chemistry	CHIM2M	4		🔍
Master [120] in Physics	PHYS2M	4		🔍
Teacher Training Certificate (upper secondary education) - Chemistry	CHIM2A	4		🔍