EPTE Modules Description

Module name	**Mathematics**
ECTS Credits	6 EC TS
Duration	14 weeks
Form of learning	Lectures, Workshops
Indicative workload	36 contact hours, 90 hours of self-study, integrated teaching practice of 24 hours for all modules
Module aims	Course 1 **Re-inventing mathematics** (2 ECTS) • to Know the history of mathematics (essential topics: 0, some mathematicians of participating country and their work, women mathematicians, infinity, decimal numbers, fractions, area, Euclidian – non Euclidean geometry) • to understand mathematics as a human activity, necessary, interesting and fascinating for all Course 2 **Thresholds in mathematics** (2 ECTS) • to understand the idea of thresholds in mathematics from different perspectives (international and national) and to give arguments for them; • to construct problems for children to get over the thresholds and to plan good education on those topics. Course 3 **Problem solving** (2 ECTS) • to develop and analyze meta-cognitive processes of solving problems and the strategies used (for example to experience thresholds from arithmetic examples to generalization in algebra)
Generic Competences	The student is able to: • reveal changes in education in European countries and in home education • identify the common ground for European education • improve language skills • improve intercultural skills • to develop aptitudes for reasoning and a problem-solving way of thinking • develop critical thinking • develop tolerance • build his/her own knowledge and let his/her pupils build their own knowledge
Specific Competences	The student is able to: • demonstrate knowledge of the history of number concepts and about number representations; • demonstrate knowledge about platonic, non-platonic and Archimedes

	solids; • demonstrate knowledge about the history of measurement; • accompany children to re-invent mathematics; • interpret and compare different curricula; • recognize thresholds/landmarks; • develop teaching approach for children to overcome thresholds/ landmarks; • recognize, put and solve problems; • discuss and evaluate strategies for problem solving with students and children; • communicate and reflect about mathematics.
Learning and Teaching approaches	Active and collaborative learning, building a learning community, personalizing tasks
Context	Study program EPTE
Level	First Cycle Degree
Obligatory requirements	English B2
Status	Compulsory
Learning outcomes	**Course 1 Re-inventing mathematics** The student is able to • explain analyses and present history background of some essential mathematical concepts (example: number 0, infinity…). • describe discoveries of mathematicians by demonstrating with examples **Course 2 Thresholds in mathematics** The student is able to • describe a part of the mathematical learning landscape including the thresholds of the guest country; • describe differences and similarities between the landscape of his own country and that of the guest country; • build some learning materials, contexts and context problems to allow primary school pupils to obtain the respective landmarks/thresholds; • develop a series of lessons to allow his pupils to obtain a landmark in the mathematical landscape; • distinguish the three levels in the learning process: informal, semi-formal and formal. **Course 3 Problem solving** The student is able to • demonstrate problem-solving skills for finding the strategy: formulating a problem, comprehending a problem, finding patterns, identifying knowledge needed for solving problems, making conjectures, generalizing, choosing appropriate representation of a problem, proving… • accompany children in horizontal and vertical mathematization
Form of Assessment	The student makes a portfolio including: • reflective diary in response to challenges of the module, and to the personal and professional value of the experience, • presentation, seminar work, self- evaluation, learning material, lesson plans (3 - 5) and reflection on teaching practice.
Learning units	**Course 1 Re-inventing mathematics**

	The development of number concepts, some concepts in geometry in the past and nowadays. Representing mathematical ideas (learning materials) throughout times. Great mathematicians and their lives and discoveries. **Course 2 Thresholds in mathematics** Thresholds as difficult concepts in mathematics (representations for those concepts are sometimes impossible or very complex). Some examples: operations with fractions, number 0, unitizing, distributive law, percentage, structure of the numbers, elementary addition and subtraction, hierarchy in geometry (concepts of shapes, growing dimensions in space and in measures). **Course 3 Problem solving** Problems. Learning materials and strategies for problem-solving. Mathematization and mathematics language. Horizontal (from the problem to the mathematics and back) and vertical mathematization (according to the three levels: informal, semi-formal, formal).
Grading	ECTS grades according to ECTS guidelines