



## EPTE Template

Module name	MATHS
Module leader/Co-leader	Kitty Palenikova
Academic staff (teachers)	
ECTS Credits	5 EC TS
Duration	13 weeks (or shorter intensive course with full workload)
Form of learning	Lectures, Workshops
Indicative workload	36 Contact hours, 89 h Independent study (120 h)
Module aims	<p>Course 1 <b>Re-inventing mathematics</b> (2 ECTS) The student:</p> <ul style="list-style-type: none"> <li>- Knows 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)</li> <li>- Understands mathematics as a human activity, necessary, interesting and fascinating for all</li> </ul> <p>Course 2 <b>Thresholds in mathematics</b> (2 ECTS) The student:</p> <ul style="list-style-type: none"> <li>- understands the idea of thresholds in mathematics from different perspective: international and national and is able to give arguments for them.</li> <li>- can construct problems for children to get over the thresholds and to plan good education on those topics.</li> </ul> <p>Course 3 <b>Problem solving</b> (2 ECTS) The student:</p> <ul style="list-style-type: none"> <li>- develops and analyzes meta-cognitive processes of solving problems and the strategies used (for example to experience thresholds from arithmetic examples to generalization in algebra)</li> </ul>

Generic Competences	<p>The student:</p> <ul style="list-style-type: none"> <li>- reveals changes in education in European countries and in home education</li> <li>- identifies the common ground for European education</li> <li>- improves language skills</li> <li>- improves intercultural skills</li> <li>- is able to reason, problem-solving</li> <li>- develops critical thinking</li> <li>- develops tolerance</li> <li>- constructs his/her own knowledge and let construct his/her students their own knowledge</li> </ul>
Specific Competences	<p>The student is able to:</p> <ul style="list-style-type: none"> <li>- demonstrate knowledge of the history of number concepts and about number representations.</li> <li>- demonstrate knowledge about platonic, non-platonic and Archimedes solids;</li> <li>- demonstrate knowledge about history of measurement;</li> <li>- accompany children to re-invent mathematics;</li> <li>- interpret and compare different curricula;</li> <li>- recognize thresholds/landmarks;</li> <li>- develop teaching approach for children to overcome thresholds/landmarks;</li> <li>- recognize, pose and solve problems;</li> <li>- discuss and evaluate strategies for problem solving with students and children;</li> <li>- communicate and reflect in mathematics.</li> </ul>
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	Obligatory
Learning outcomes	<p><b>Course 1 Re-inventing mathematics</b></p> <p>The student</p> <ul style="list-style-type: none"> <li>- explains analyses and presents history background of some essential mathematical concepts (example number 0, infinity...).</li> <li>- describes discoveries of mathematicians of big ideas by demonstrating examples</li> </ul> <p><b>Course 2 Thresholds in mathematics</b></p> <p>The student</p>

	<ul style="list-style-type: none"> <li>- describes a part of the mathematical learning landscape inclusively thresholds of the guest country;</li> <li>- describes differences and similarities between the landscape of his own country and that of the guest country;</li> <li>- constructs some learning materials, contexts and context problems to let primary school students obtain the concerning landmarks/thresholds;</li> <li>- develops a series of lessons to let his students obtain a landmark in the mathematical landscape;</li> <li>- can distinguish the three levels in the learning process: informal, semi-formal and formal.</li> </ul> <p><b>Course 3 Problem solving</b> The student</p> <ul style="list-style-type: none"> <li>- demonstrates problem solving skills for finding the strategy: formulating a problem, comprehension of a problem, finding patterns, identifying knowledge needed for solving problem, making conjectures, generalizing, choosing appropriate representation of a problem, proving...</li> <li>- is able to accompany children in horizontal and vertical mathematization</li> </ul>
Form of Assessment	<p>The student makes a portfolio:</p> <ul style="list-style-type: none"> <li>- reflective diary on responds to challenges of the module, and to the personal and professional value of the experience,</li> <li>- presentation, seminar work, self- evaluation, learning material, lesson plans (3 - 5) and reflection on teaching practice.</li> </ul>
Learning units	<p><b>Course 1 Re-inventing mathematics</b> The development of number concepts, some concepts in geometry in the history and nowadays. Representing mathematical ideas (learning materials) in the history. Great mathematicians and their lifes and discoveries.</p> <p><b>Course 2 Thresholds in mathematics</b> Thresholds as difficult concepts in mathematics (representations for those concepts are sometimes impossible or very complex). Some examples: operations with the 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).</p>

	<p><b>Course 3 Problem solving</b>  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).</p>
Literature	<ul style="list-style-type: none"> <li>- Fosnot, C. T. and Dolk, M. (2001) <i>Constructing number sense, addition and subtraction</i>. Portsmouth, Heineman</li> <li>- Fosnot, C. T. and Dolk, M. (2001) <i>Constructing multiplication and division</i>. Portsmouth, Heineman</li> <li>- Book of selected research paper – around 300 pages (we choose relevant research papers) which is updated every year.</li> </ul>
Grading	ECTS grades according to ECTS guidelines
Other information	The student performs some teaching of mathematics in the host county.
Internet address of the EPTE course	