Introduction to the Mathematical Method

Syllabus

Course code:	6077
Number of ECTS credits:	6
Semester:	1st (September-January)
Prerequisites:	None
Recommended components:	None
Language of instruction:	Spanish (students are allowed to ask questions and write homeworks and exams in English)

Course description

The subject *Introduction to the Mathematical Method* aims to present the student in a unified way, and with time for reflection, some of the main singularities of the mathematical method and its language: the differences between natural and formal language, the basic rules of logic, the idea of axiomatic theory, different proof techniques, strategies for solving problems. . .

To work with all these ideas in practice, many of the contents that students know from high school will be revisited, looking at them from this new perspective of university mathematics.

Learning outcomes and competences

After successful completion of this course you will:

1. Know and use mathematical language, detect its differences with ordinary language and develop skills in reading and writing mathematical arguments.

2. Know and use the fundamentals of logical reasoning.

3. Develop a critical attitude about one's own and others' mathematical production.

4. Review some pre-university knowledge (number sets, equations and inequalities, factorizations, geometry, trigonometry, combinatorics and counting) from a university point of view.

5. Know basic and more advanced proof techniques, and apply them to statements referring to pre-university knowledge.

6. Know the basic guidelines of the process of solving mathematical problems and develop attitudes and skills to solve problems based on pre-university knowledge.

Course contents

I. Logic and mathematical language.

Natural language and formal language. First-order propositional logic: connectors and quantifiers. Rules of reasoning.

II. Problem solving.

Phases in problem solving, intuition and rigor. Problem solving reviewing pre-university knowledge from a university point of view (numbers, combinatorics, inequalities, geometry, trigonometry. . .).

References

Main texts

1. M. de Guzmán. Cómo hablar, demostrar y resolver en matemáticas. Anaya, 2003. ISBN 9788466726139.

2. D. Solow. How to read and do proofs (an introduction to mathematical thought processes). Wiley, 2014. ISBN 9781118164020.

Supplementary references

1. P. Suppes. Introducción a la lógica matemática. Reverté, 2004. ISBN 9788429191394.

2. J. Nolt, D. Rohatyn & A. Varzi. Schaum's Easy Outline of Logic. Schaun, 2011. ISBN 9780071777537.

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