UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

History of Mathematics

2223-1-F4001Q096

Aims

In line with the educational objectives of the Master Degree in Mathematics, the course aims at providing the knowledge of some important chapters in the history of mathematics. It will also build the skill and ability to connect some classical results to more modern theories. In other words, the aim is to present a number of classical and elementary results that you always wanted to know (but were afraid to ask).

Contents

Transcendental numbers. Squaring the circle
Algebraic numbers. Algebraic equations.
Integer numbers. Prime numbers.

Proofs will be required.

Detailed program

Squaring the circle and the hyperbola. Computing pi (Archimedes, Huygens, Newton).
Rational and irrational numbers, algebraic and transcendental (Pytagoras, Liouville, Cantor).
Irrationality and transcendence of e (Eulero, Hermite), and pi (Lambert, Lindemann).
Algebraic equations and the fundamental theorem of algebra (d'Alembert, Gauss).
Equations of first,second third and fourth degree (Tartaglia, Cardano, Ferrari).
Equations of fifth degree (Ruffini, Abel, Galois).
Roots of a polynomial in an interval (Cartesio, Sturm).
Prime numbers. The fundamental theorem of arithmetic (Euclid, Gauss).

Primes are infinite (Euclid, Eulero). Primes in arithmetic progressions (Dirichlet).
Distribution of prime numbers (Riemann, Hadamard, de la Vallée Poussin).

The seminars of the students are part of the program.

Prerequisites

The algebra, analysis, and geometry in standard undergraduate mathematical courses. Some complex analysis may be
helpful. In case of problems, the lecturer may provide help.

Teaching form

(1) The student is expected to read and study some books on the history of mathematics.
(2) The student is expected to write a report and give a seminar on an original memoir.
(3) The teacher will present in the classroom, with proofs, a certain number of classical theorems and the genesis of some theories encountered in the mathematical curriculum.

Textbook and teaching resource

Some books on the history of mathematics:
C.Boyer "A history of Mathematics".
M.Kline "Mathematical thought from ancient to modern times".
V.J.Katz "A history of mathematics".
Notes provided by the teacher.

Semester

1st semester.

Assessment method

The exam consists of two parts, a written report with a seminar on a subject in agreement with the lecturer, and an oral examination. These two parts, the witten report with seminar and the oral exam, can be taken at different times. The final evaluation results from the average between the parts of the examination. Mark out of thirty. The exam is passed if the evaluation is at least 18/30.

N.B. The program of the course **Storia della Matematica - Elementi** (4 CFU) is the same of Storia della Matematica (8 CFU), but for the exam the written report and the seminar are not required.

Office hours

On appointment. E-Mail: leonardo.colzani@unimib.it

Sustainable Development Goals

QUALITY EDUCATION