



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

SYLLABUS DEL CORSO

Storia della Matematica

2425-1-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 (Pythagoras, Liouville, Cantor).
Irrationality and transcendence of e (Eulero, Hermite), and pi (Lambert, Lindemann).
Algebraic equations and the fundamental theorem of algebra (d'Alembert, Gauss).
Roots of a polynomial in an interval (Cartesio, Sturm).
Equations of first, second, third and fourth degree (Tartaglia, Cardano, Ferrari).
Equations of fifth degree (Ruffini, Abel, Galois).
Diophantine equations (Archimede, Diofanto, Fermat, Eulero).

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

The course is scheduled in Italian but could be held in English in the presence of foreign students.

- (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".

J.Barrow-Green & J.Gray "The History of Mathematics: A Source-Based Approach ".

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. 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
