## ***History of Mathematics*** Prof. Marco Antonio Pellegrini; Prof. Mauro Spera

***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

The course aims at presenting the evolution of mathematical thinking from antiquity to modern era. Eventually, the student will be able to critically explore original works within their historical context.

***COURSE CONTENT***

First module (20 h): prof. Spera

The first module will deal with methodological and technical aspects of ancient greek mathematics, focussing on specific issues alongwith their modern ramifications, building on Euclid, Archimedes and Apollonius; specifically:

*theory of proportions, conics (including pre-apollonian theory), method of exhaustion and stereometry, parallelism and non euclidean geometry, projective geometry.*

Second module (20 h): prof. Pellegrini

We shall study the evolution of algebra, from antiquity to present days. Our thread will be provided by the theory of equations and their resolution by radicals, with special focus on the Italian algebraic school. The milestones of this route will be:

* Algebra in antiquity (Egypt, Mesopotamia, Diophantus).
* Algebra in the Middle Ages (Brahmagupta, al-Khwarizmi, Fibonacci, Bhaskara, Pacioli).
* Third and fourth order equations (Tartaglia, Cardano, Ferrari, Bombelli).
* Higher order equations (Lagrange, Ruffini, Abel, Galois).
* The classification theorem for finite simple groups (Jordan, Dedekind, Lie, Frobenius, Gorenstein).

***READING LIST***

First module: prof. Spera

M. Spera *Introduzione alla matematica antica,* note del corso disponibili su Blackboard.

**Further references**

L. Russo, *La rivoluzione dimenticata,* Feltrinelli (3ed. 2003).

T. Heath, *History of Greek Mathematics,* (2 voll.) Dover (1981)

J. Barrow-Green, J. gray, R. Wilson, *The History of Mathematics: A Source-Based Approach,*

2 voll. MAA Press (2019-22)

E.J. Dijksterhuis*,* *Archimede,* Ponte alle Grazie (1989).

Apollonius of Perga, *Conics: Books I-IV,* Green Lion Press (2013).

Euclide, *Tutte le opere,* a cura di F. Acerbi, Bompiani (2007).

Second module: prof. Pellegrini

F. Toscano, *La formula segreta,* Sironi Editore, 2009.

S. Maracchia, *Storia dell’Algebra,* Liguori Editore, 2008.

L. Infeld, *Évariste Galois*, *La breve vita di un genio della matematica*, Castelvecchi Editore (2019).

R. Franci, L. Toti Rigatelli, *Storia della teoria delle equazioni algebriche,* Ugo Mursia Editore (1979).

***TEACHING METHOD***

Traditional classroom lectures (20+20), accompanied by usage of digital material, including original texts.

***ASSESSMENT METHOD AND CRITERIA***

Assessment will take place through an oral exam. The final evaluation will assess the candidates’ explanatory efficacy, clearness and accuracy, together with assimilation of the concepts and their own personal critical elaboration.

Prerequisites involve standard content of a Bachelor Programme in Mathematics. Regular attendance is strongly encouraged.

***NOTES AND PREREQUISITES***

Prof. Spera will meet students in his office (Via Garzetta 48, South Building, 4th floor) during lesson days or, when necessary, online, by appointment (mauro.spera@unicatt.it).

Prof. Pellegrini will meet students in his office (Via Garzetta 48, South Building, 4th floor) compatibly with his teaching duties. Online mentoring via Blackboard will be possible as well, by appointment ([marcoantonio.pellegrini@unicatt.it](mailto:marcoantonio.pellegrini@unicatt.it)).

*Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG or on the Faculty notice board.*