Commutative Algebra (Algebra Commutativa) - 2015-2016

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It is open to students of the **Mathematics Master's Degree (Laurea Magistrale)**, and of the **Erasmus Master Mundus ALGANT program**.

When: From October 1st to January 25th

Where: TBA

Total number of hours: about 64 (8 credits).

Examination: written exam.

Program

We introduce basic notions in Commutative Algebra required for Algebraic Geometry and Number Theory: commutative rings and modules, ideals, Jacobson radical and nilradical, spectrum of a ring. Tensor product and flatness. Rings and modules of fractions, localisation. Integral dependence. Valuation rings. Noetherian and Artinian rings. Discrete valuation rings and Dedekind domains. Dimension theory and regular local rings.

Prerequisites A first Algebra Course: definitions of rings, fields, vector spaces and their basic theorems. The course can be followed independently, but students attending *Introduction to Ring Theory* and/or *Number Theory 1* will benefit most.

References

Lecture notes, available at the course's homepage `http://mgaruti.weebly.com/ca.html`

Further references

1) M. F. Atiyah and I. G. Macdonald, *Introduction to Commutative Algebra*, Addison-Wesley 1969 (Italian edition by Feltrinelli, 1981).

2) D. Eisenbud, *Commutative Algebra with a view toward Algebraic Geometry*, Graduate Texts in Math. Vol. 150, Berlin, Springer-Verlag, 1994

3) H. Matsumura, *Commutative Algebra*, W.A. Benjamin, 1970.

4) L. Ramero, *Grimoire d'Algèbre Commutative*, lecture notes (linked from course's homepage).