

Introduction to algebraic logic

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The aim of this course is to study some basic notions about Boolean algebras and algebraic logic. In the first part of the course an algebraic approach for the classical propositional logic is developed. Possible applications of Boolean algebras can be treated following a common interest of the students.

- Course duration: 20 hours
- Class schedule: To agree with students
- Date: May 2018
- Evaluation: Monographic work
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- Prerequisites: The course is self contained and a basic mathematical maturity is required.

- **Program**

1. **Classical propositional logic**

Basic notions

Hilbert style calculus

Mendelson calculus

Soundness and completeness

2. **Boolean algebras**

Lattices and order
Equational definition for the lattice order structure
Bounded lattices
Distributive lattices
Complemented lattices
Boolean algebras
Filters, prime filters, maximal filters
Simple algebras
Subdirect representation for Boolean algebras
Equational completeness

3. Completeness: algebraic methods

Lindembaum algebra related to the propositional calculus
Strong completeness

References

- [1] Balbes R., Dwinger P.: *Distributive Lattices*, Abstract Space Publishing USA, (2011).
- [2] Burris, S., Sankappanavar, H.P.: *A Course in Universal Algebra*. Graduate Text in Mathematics, vol. 78. Springer, New York (1981)
- [3] Halmos P. *Lectures on Boolean Algebras*, D. Van Nostrand Company, Inc, Princeton, New Jersey, (2013).