

UNIVERSITY OF CRAIOVA
Faculty of Mathematics and Informatics
Fundamental domain : MATHEMATICS
Speciality : MATHEMATICS
Duration of studies : 3 years

Approved with academic year
2008-2009

Arithmetic in rings

Instructor : Lector.dr. Christina-Theresia Dan

Cod: M2406

Cycle I: LICENCE

Second Year , Semester IV, Cours 28 hours, Seminar 28 hours

Nr. of credits: 5

Domain: Mathematics

Type : optional

Category : specialized discipline

Objectives: To have a knowledge of the principal types of rings: euclidean, principal, factorial: definitions, fundamental properties and characteristic computing algorithms; to apply the basic results of arithmetics in rings in solving applicative problems.

Necessary background: The courses of: logics and set theory, algebra (I, II).

Evaluation form : Colocutional examination (C)

Contents:

- C₁ : The relation of divisibility. Association in divisibility.
- C₂ : The greatest common divisor. The least common multiple.
- C₃ : Irreducible elements. Prime elements.
- C₄ : Euclidean rings.
- C₅ : Bézout's relations.
- C₆ : Linear equations in euclidean rings.
- C₇ : Principal rings.
- C₈ : Factorization in principal rings.
- C₉ : Factorial rings.
- C₁₀ - C₁₁: The factoriality of the polinomial rings.
- C₁₂: Criteria for irreducible polinoms.
- C₁₃ - C₁₄: Factorization of polinoms with integer coefficients: Berlekamp's algorithm; modular factorization for polinoms from $\mathbb{Z}[X]$.

Bibliography:

1. Albu, T., Ion, I. D., *Itinerar elementar în algebra superioară*, Editura All Educational, București, 1997.
2. Bușneag, D., *Capitole speciale de algebră*, Editura Universitaria, Craiova, 1997.
3. Dincă, Al., Dan, C., *Algebră III*, Editura Universitaria, Craiova, 2009.
4. Ion, I. D., Radu, N., *Algebră*, Editura Didactică și Pedagogică, București, 1981.
5. Năstăsescu, C., Niță, C., *Bazele algebrei I*, Editura Academiei, București, 1986.