

UNIVERSITY OF CRAIOVA
Faculty of Mathematics and Computer Science
Department of mathematics
Fundamental domain : Exact sciences
Domain: Mathematics
Master : Applied mathematics
Form : Day classes
Duration of studies : 2 years
Approved with academic year 2008-2009

Topics in theory of categories

Syllabus

Course coordinator: Prof.dr. Dumitru Buşneag
Code: MA111
Second Cycle: MASTER
First Year , Semester 1, Course 28 hours, Seminar 28 hours
No. of credits: 6
Domain: Mathematics
Type : compulsory (or optional)
Category: fundamental (or speciality, complementary)

Objectives : To enable the students with the language of theory of categories , as well to present more mathematical results in the specific language of theory of categories.

Necessary background : All courses of algebra , mathematical analysis and topology from Licence cycle.

Evaluation : Exam (E).

Contents:

- A.** Notion of category. Examples. Subcategory. Dual category. Duality principle. Product of categories.
- B.** Special morphisms in a category. Kernel (cokernel) for a couple of morphisms.
- C.** Functors. Examples. Remarkable functors. Functorial morphisms. Equivalent categories.
- D.** Representable functors; adjoint functors.
- E.** Products (coproducts) of objects in a category.
- F.** Inductive (projective) limits of objects in a category.
- G.** Fibred product; fibred coproduct.
- H.** Injective(projective) objects.
- I.** Applications of theory of categories in mathematical analysis and topology.

Bibliography:

1. M. Barry: *Theory of categories*, Academic Press, 1965.
2. D. Buşneag: *Categories of algebraic logic*, Ed. Academiei, Bucuresti, 2006.
3. P.J. Cameron: *Sets, Logic, and Categories*, Springer Undergraduate Mathematics Series , 1999.
4. S.M. Lane: *Categories for the Working Mathematician*, Springer, 1997.
5. C. Nastasescu: *Inele. Module. Categorii*, Ed. Academiei, Bucuresti, 1976.