



COURSE PROGRAMME

1. Information about the programme

1.1 University	University "Alexandru Ioan Cuza" of Iasi
1.2 Faculty	Faculty of Mathematics
1.3 Department	Department of Mathematics
1.4 Domain	Mathematics
1.5 Cycle	Masters
1.6 Programme / Qualification	Applied Mathematics

2. Information about the course

2.1 Course Name	Algebraic foundations of computer science				
2.2 Course taught by	Assoc. Prof. PhD. VIOREL MIHAI GONTINEAC				
2.3 Seminary / laboratory taught by	Assoc. Prof. PhD. VIOREL MIHAI GONTINEAC				
2.4 Year	I	2.5 Semester	II	2.6 Type of evaluation*	E

*E - Exam / C - Colloquium / V - Verification

**OB - Obligatory / OP - Optionally / F - Facultative

3. Total hours (estimated per semester and activities)

3.1 Number of hours per week	4	3.2 course	2	3.3 seminary/ laboratory	2
3.4 Total number of hours	56	3.5 course	28	3.6 seminary/ laboratory	28
Distribution					hours
Individual study using textbooks, course notes, bibliography items, etc.					60
Supplementary study (library, on-line platforms, etc.)					20
Individual study for seminary/laboratory, homeworks, projects, etc.					35
Tutoring					0
Examination					4
Other activities					0
3.7 Total hours of individual activity*					119
3.8 Total hours per semester					175
3.9 Credit points					7

4. Pre-requisites - Curriculum (if necessary)

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5. Conditions (if necessary)

5.1 Course	
5.2 Seminary / Laboratory	

6. Objectives

7. Specific competencies/Learning outcomes

- writes scientific papers, academic work, and technical documentation
- promotes knowledge transfer
- carries out interdisciplinary research activities
- uses computer-aided software engineering tools
- thinks abstractly

8. Contents

8.1 Course	Teaching methods	Remarks (number of hours, references)
1. Introduction	Interactive blackboard or online whiteboard presentation	2 ore
Category	Interactive blackboard or online whiteboard presentation	4 ore
Special objects and morphisms	Interactive blackboard or online whiteboard presentation	2 ore
Limits and colimits	Interactive blackboard or online whiteboard presentation	4 ore
Functors	Interactive blackboard or online whiteboard presentation	2 ore
Natural transformations 1	Interactive blackboard or online whiteboard presentation	2 ore
Natural transformations 2	Interactive blackboard or online whiteboard presentation	2 ore
Adjoint functors	Interactive blackboard or online whiteboard presentation	2 ore
9. (Co)Algebra of a functor	Interactive blackboard or online whiteboard presentation	4 ore
Monads 1	Interactive blackboard or online whiteboard presentation	2 ore
Monads 2	Interactive blackboard or online whiteboard presentation	2 ore
Closed Cartesian Categories	Interactive blackboard or online whiteboard presentation	2 ore
Monoidal Categories	Interactive blackboard or online whiteboard presentation	2 ore
	Interactive blackboard or online whiteboard presentation	

Bibliography

Main references:

M. Barr, C. Wells, Category Theory Lecture Notes for ESSLI, 1999
B.C.Pierce, Basic Category Theory for Computer Scientists, M.I.T. Press, 1991
G. Radu, Teoria Categoriilor, Ed. Junimea, Iași

Other references:

A. Asperti, G.Longo, Categories Types and Structures, M.I.T. Press, 1991
J.L. Fiadeiro, Categories for Software Engineering, Springer Verlag, 2004
G.Gierz, §.a., Continuous Lattices and Domains, Cambridge Univ. press, 2003
G. Winskel, Lecture Notes in Category Theory, BRICS Lecture Series, 2002

8.2 Seminary / Laboratory	Teaching methods	Remarks (number of hours, references)
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Bibliography
Main references:
M. Barr, C. Wells, Category Theory Lecture Notes for ESSLLI, 1999
B.C.Pierce, Basic Category Theory for Computer Scientists, M.I.T. Press, 1991
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G. Winskel, Lecture Notes in Category Theory, BRICS Lecture Series, 2002

9. Coordination of the contents with the expectations of the community representatives, professional associations and relevant employers in the corresponding domain

10. Assessment and examination

10.1 Continuous assessment	Percentage (min. 30%)	50		
Course	Assessment type	Mixed assessment		
	Percentage	50		
	Failure to pass the continuous assessment results in failure to pass the final assessment	No		
	Assessment methods	Details Project Homework	Percentage 25 75	with reexamination Yes Yes
Seminary / Laboratory	Assessment type	Mixed assessment		
	Percentage	50		
	Failure to pass the continuous assessment results in failure to pass the final assessment	No		
	Assessment methods	Details Case study Essay	Percentage 25 75	with reexamination Yes Yes

10.2 Final assessment	Percentage (max. 70%)	50
	Assessment type	Final written assessment

10.3 Special notes (special situations in assessment)

10.4 Minimum performance standard

Date,	Course coordinator, Assoc. Prof. PhD. VIOREL MIHAI GONTINEAC	Seminary coordinator, Assoc. Prof. PhD. VIOREL MIHAI GONTINEAC
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Aproval date in the department,

**Head of the department,
Prof. PhD. IONEL DUMITREL GHIBA**