SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babes-Bolyai University**
1.2 Faculty	**Faculty of Mathematics and Computer Science**
1.3 Department	**Department of Mathematics**
1.4 Field of study	**Mathematics**
1.5 Study cycle	**Master**
1.6 Study programme / Qualification	**Advanced Mathematics**

2. Information regarding the discipline

2.1 Name of the discipline	**Methodology of the Scientific Research in Mathematics**						
2.2 Course coordinator	**Prof. dr. Marian Muresan**						
2.3 Seminar coordinator	**Prof. dr. Marian Muresan**						
2.4. Year of study	**2**	2.5 Semester	**3**	2.6. Type of evaluation	**C**	2.7 Type of discipline	**Compulsatory**

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	3	Of which: 3.2 course	2	3.3 seminar/laboratory	1
3.4 Total hours in the curriculum	42	Of which: 3.5 course	28	3.6 seminar/laboratory	14
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					28
Additional documentation (in libraries, on electronic platforms, field documentation)					28
Preparation for seminars/labs, homework, papers, portfolios and essays					17
Tutorship					28
Evaluations					3
Other activities:					

3.7 Total individual study hours	108
3.8 Total hours per semester	150
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	• Mathematical analysis, Functional analysis, Differential equations, Algebra, Geometry
4.2. competencies	• Competencies connected to the above-mentioned domains

5. Conditions (if necessary)

5.1. for the course	• Lecture room with blackboard and projector
5.2. for the seminar /lab activities	• Lecture room with blackboard and projector

6. Specific competencies acquired

Professional competencies	Classification of the scientific subjects. Domains of mathematics. Present tendencies of the developing of mathematics. Understanding of mathematics. Types of mathematical novelties. Communications of mathematics: mathematical publications. Their classification. Data bases on internet. The book as carrier of mathematical novelties. Data bases on mathematics. Documentation based on internet. The MR, ZBmath, and ISI. The route to research in mathematics. Topics of research. Management of the research activity, instruments of scientific research. Where and how do we publish mathematical novelties. Acceptance criteria. Evaluation of the mathematical activity. National standards. International standards. Cases studies. Personalities. The Romanian mathematical school.
Transversal competencies	The student is oriented toward realization of connections between branches of mathematics as well as between mathematics and other parts of sciences.

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• Get accustomed to write a stuff, a scientific or methodic paper, ability to search pertinent information supplied by data bases, ability to correctly evaluate a mathematical paper. We expect that the student will learn from the experience of great personalities in mathematics.
7.2 Specific objective of the discipline	• The concrete aim of this course is to endow the student with the ability of quick orientation in the large existing literature and of writing valuable papers.

8. Content

8.1 Course	Teaching methods	Remarks
1. Problems of a young researcher	Exposure, debate	
2. Classification of the scientific subjects. Classification of the mathematical subjects.	Exposure, debate	
3. Types of mathematical objects	Exposure, debate	
4. Dynamics of mathematical development	Exposure, debate	
5. Understanding of understanding of mathematics	Exposure, debate	
6. Mathematics in the educational system	Exposure, debate	
7. Communication of mathematics. Classification of publications in mathematics	Exposure, debate	
8. Documentation in mathematics	Exposure, debate	
9. Data bases	Exposure, debate	
10. Road to the scientific research. Instruments of the scientific research.	Exposure, debate	
11. Where and how to publish a new result? Criteria for evaluation of a mathematical work.	Exposure, debate	
12. Evaluation of the activities of mathematicians. Performance criteria.	Exposure, debate	

13. Romanian school of mathematics. Case studies.	Exposure, debate	
14. Oral examination	Debate	

Bibliography
1. P. Ball, Index aims for fair ranking of scientists. Nature, *436*, 900, 2005.
2. R. E. Berger, A Scientific Approach to Writing for Engineers and Scientists, Wiley, New Jersey, 2014.
3. J. Blackwell, J. Martin, A Scientific Approach to Scientific Writing, Springer, New York, 2011.
4. L. Bornmann, H.-D. Daniel, (2005). Does the h-index for ranking of scientists really work? Scientometrics, *65*, 391-392, 2005.
5. R. Descartes, Reguli utile si clare pentru indrumarea mintii in cercetarea adevarului, Editura Stiintifica, Bucuresti, 1964.
6. . S. Mac Lane, Mathematics. Form and Function, Springer, Berlin, 1986.
7. H.F. Moed, Citation Analysis in Research Evaluation, Springer, 2005.
8. P. Odifreddi, The Mathematical Century. The 30 greatest problems of the last 100 years, Princeton Univ. Press, 2004.
9. J.P. Pier (ed), Development of mathematics: 1950-2000, Birkhauser, Basel, 2000.
10. G. Polya, Descoperirea in matematica, Editura Stiintifica, Bucuresti, 1971.
11. S. Ramon, Y. Cojal, Drumul spre stiinta, Editura Politica, Bucuresti, 1967.
12. I.A. Rus, E. Muntean, Matematica si informatica. Trecut, prezent si viitor, Promedia plus, Cluj-Napoca, 1998.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Problems of a young researcher. Classification of the scientific subjects. Classification of the mathematical subjects.	Debate	
2. Types of mathematical objects. Dynamics of mathematics development.	Debate	
3. Understanding of understanding of mathematics. Mathematics in the educational system.	Debate	
4. Road to the scientific research. Instruments of the scientific research. Documentation in mathematics. Data bases.	Debate	
5. Where and how to publish a new result? Criteria for evaluation of a mathematical work.	Debate	
6. Evaluation of the activities of mathematicians. Performance criteria. Romanian school of mathematics. Case studies.	Debate	
7. Oral examination	Debate	

Bibliography
1. P. Ball, Index aims for fair ranking of scientists. Nature, *436*, 900, 2005.
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9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

- The content of the course is designed satisfying the expectations of various groups of experts of well-known authority.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course		Debate	50%
10.5 Seminar/lab activities		Achievement and display of 4 case studies selected from the followings: Evaluation of a survey paper published after 2000. Evaluation of a monography published after 1980. Introducing an expert from the field of interest. Introducing a relevant open problem. Introducing a relevant notion. Introducing an ISI journal of mathematics. Introducing of an important momento in the history of the field of interest.	50%
10.6 Minimum performance standards			
➢ At least a half in 10.4 and in 10.5.			

Date	Signature of course coordinator	Signature of seminar coordinator
May 1st, 2015	Prof. dr. Marian Muresan	Prof. dr. Marian Muresan

Date of approval

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Signature of the head of department

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