

## SYLLABUS

### 1. Information regarding the programme

1.1 Higher education institution	Babes-Bolyai University Cluj-Napoca
1.2 Faculty	Faculty of Mathematics and Computer Science
1.3 Department	Mathematics
1.4 Field of study	Mathematics
1.5 Study cycle	Bachelor
1.6 Study programme / Qualification	Mathematics and Computer Science (English)

### 2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)	<b>Geometrie I (Geometrie Analitică)/Analytic Geometry</b>						
2.2 Course coordinator	<b>Prof. Dorin Andrica</b>						
2.3 Seminar coordinator	<b>Prof. Dorin Andrica</b>						
2.4. Year of study	<b>I</b>	2.5 Semester	<b>1</b>	2.6. Type of evaluation	<b>E</b>	2.7 Type of discipline	<b>Compulsory</b>
2.8 Code of the discipline	MLE0013						

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

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					20
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					20
Tutorship					14
Evaluations					10
Other activities: homework					10
3.7 Total individual study hours	94				
3.8 Total hours per semester	150				
3.9 Number of ECTS credits	6				

### 4. Prerequisites (if necessary)

4.1. curriculum	•
4.2. competencies	• Basic knowledge of algebra, trigonometry and elementary

	geometry
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### 5. Conditions (if necessary)

5.1. for the course	•
5.2. for the seminar /lab activities	•

### 6. Specific competencies acquired

<b>Professional competencies</b>	<p>C1.1 The ability to identify concepts, theories and use of specific description language</p> <p>C2.1 The ability to identify basic concepts used in the description of specific phenomena and processes</p> <p>C4.5 The ability to produce a mathematical model for a certain problem.</p>
<b>Transversal competencies</b>	<p>CT1. Applying rigorous and efficient work rules, displaying a responsible attitude towards the scientific and educational and creative order to maximize their potential in specific situations with respect to the basic principles and norms of professional ethics</p>

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

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>Acquiring theoretical and practical knowledge necessary for understanding the principles and methods of analytic geometry.</li> </ul>
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> <li>Introduction of basic notions analytic geometry (vectors, coordinates, straight lines, planes, conical sections, quadric surfaces, cylindrical, conical, conoidal and rotation surfaces), the study of their properties and of the relations between them, by means of the geometric transformations.</li> </ul>

### 8. Content

8.1 Course	Teaching methods	Remarks
1. Vector algebra and coordinates (3 lectures)	Lecture, description, exemplifications by using multimedia tools	
2. The straight line in the plane (1 lecture)	Lecture, description, exemplifications by using multimedia tools	
3. The line and plane in space (2 lectures)	Lecture, description, exemplifications by	

	using multimedia tools	
4. Conical sections on the canonical equations (2 lectures)	Lecture, description, exemplifications by using multimedia tools	
5. Cuadric surfaces on the canonical equations (1 lecture)	Lecture, description, exemplifications by using multimedia tools	
6. Generated surfaces (1 lecture)	Lecture, description, exemplifications by using multimedia tools	
7. Isometries and affine transformations in the plane (2 lectures)	Lecture, description, exemplifications by using multimedia tools	
8. Isometries and affine transformations in space (2 lectures)	Lecture, description, exemplifications by using multimedia tools	

#### Bibliography

1. D. Andrica, L. Topan - Analytic Geometry, Cluj University Press, 2004
2. M. Audin - Geometry, Springer, 2003
3. M. Berger - Geometry (vol. I and II), Springer, 1987
4. P.A. Blaga – Geometrie si grafica I (lecture notes)
5. P. A. Blaga - Lectures on Classical Differential Geometry, Risoprint, 2005
6. D. Dogaru - Elemente de grafica tridimensionala, Editura Stiintifica si Enciclopedica, 1988
7. P. A. Eggerton, W.S. Hall - Computer Graphics (Mathematical First Steps), Prentice Hall, 1999
8. N.N. Golovanov - Geometricheskoe modelirovanie, Izd. Fizmatlit, 2002 (in Russian)
9. M.E. Mortenson - Geometric Modeling (2nd edition), John Wiley, 1995
10. D.F. Rogers, J.A. Adams - Mathematical Elements for Computer Graphics (2nd edition), McGraw-Hill, 1990
11. <http://www.cs.ubbcluj.ro/~pablaga/geoinf/geometrie.html>

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Vector algebra and coordinates (3 seminars)	Description, explanation, independent and/or team study	
2. The straight line in the plane (1 seminar)	Description, explanation, independent and/or team study	
3. The line and plane in space (2 seminars)	Description, explanation, independent and/or team study	

4. Conical sections on the canonical equations (2 seminars)	Description, explanation, independent and/or team study	
5. Cuadric surfaces on the canonical equations (1 seminar)	Description, explanation, independent and/or team study	
6. Generated surfaces (1 seminar)	Description, explanation, independent and/or team study	
7. Isometries and affine transformations in the plane (2 seminars)	Description, explanation, independent and/or team study	
8. Isometries and affine transformations in space (2 seminars)	Description, explanation, independent and/or team study	

#### Bibliography

1. S.L. Atanasijan, V. I. Glizburg – Culegere de probleme de geometrie, vol. I, Eksmo Education, Moscova, 2000 (in Russian)
2. Cezar Coșniță ș.a. - Culegere de probleme de geometrie analitică, Editura didactică și pedagogică, 1963
3. D. Kletenik – Problems in Analytic Geometry, Mir Publishers, Moscow, 1969
3. C. Ionescu-Bujor, O. Sacter - Exerciții și probleme de geometrie analitică și diferențială, volumul I, Editura didactică și pedagogică, 1963
4. F. Rado ș.a. - Culegere de probleme de geometrie, Lito UBB, 1979
5. Ion D. Teodorescu - Geometrie analitică și elemente de algebră liniară, culegere de probleme (ediția a IIa), Editura didactică și pedagogică, 1971

### 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 notions assimilated are essential for any prospective math teacher and they will be, as well, very useful in any kind of activity related to computer graphics and CAGD.

### 10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course		Final written exam	75%
10.5 Seminar/lab activities		Active attendance, solving	25%

		the homeworks	
10.6 Minimum performance standards			
<ul style="list-style-type: none"> <li>➤ The student should attend at least half of the seminars.</li> <li>➤ The grade of the written exam should be at least 5.</li> </ul>			

Date

.April 30, 2019.

Signature of course coordinator

Prof. dr.Dorin Andrica

Signature of seminar coordinator

Prof. dr. Dorin Andrica

Date of approval

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Signature of the head of department

Prof. dr. Octavian Agratini