

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)	Geometrie 3 (Geometria diferențială a curbelor și suprafețelor)/Differential Geometry of Curves and Surfaces						
2.2 Course coordinator	Assoc. Prof. Paul Blaga						
2.3 Seminar coordinator	Assoc. Prof. Paul Blaga						
2.4. Year of study	2	2.5 Semester	3	2.6. Type of evaluation	VP	2.7 Type of discipline	Compulsory
2.8 Code of the discipline	MLE0016						

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

3.1 Hours per week	4	Of which: 3.2 course	4	3.3 seminar/laboratory	4
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:					10
3.7 Total individual study hours	94				
3.8 Total hours per semester	150				
3.9 Number of ECTS credits	5				

4. Prerequisites (if necessary)

4.1. curriculum	<ul style="list-style-type: none"> Calculus, Linear algebra, basic differential equations
4.2. competencies	

5. Conditions (if necessary)

5.1. for the course	<ul style="list-style-type: none"> • A lecture hall with video projector
5.2. for the seminar /lab activities	<ul style="list-style-type: none"> •

6. Specific competencies acquired

Professional competencies	<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>
Transversal competencies	<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"> • The correct use of the terminology specific to differential geometry • The ability to use the algorithms of differential geometry and the differential geometric concepts in problem solving 	•
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> • The ability to learn • Social abilities • Communication abilities 	•

8. Content

8.1 Course	Teaching methods	Remarks
1) Plane curves. The tangenta and the normal to a plane curve ([2] pag. 127-136)	Lecture, description, exemplifications by using multimedia tools	
2) Space curves. The osculating plane ([2] pag.136-138)	Lecture, description, exemplifications by using multimedia tools	

3) The Frenet frame and formulae. The curvature and the torsion ([2] pag.138-143)	Lecture, description, exemplifications by using multimedia tools	
4) The geometric interpretation of the torsion of a curve ([1] pag.140-143)	Lecture, description, exemplifications by using multimedia tools	
5)The evolute and the involute of a plane curve ([2] pag.164-166)	Lecture, description, exemplifications by using multimedia tools	
6) The envelope of the family of plane curves ([2]160-163)	Lecture, description, exemplifications by using multimedia tools	
7) Surfaces. The tangent plane and the normal to a surface ([2] pag.174-176)	Lecture, description, exemplifications by using multimedia tools	
8) The first fundamental form and applications ([2] pag. 183-189)	Lecture, description, exemplifications by using multimedia tools	
9) The second fundamental form. The normal curvature ([2] pag.194-199)	Lecture, description, exemplifications by using multimedia tools	
10) Asymptotic lines on a surface. The principal curvature of a surface ([2] pag.199-209)	Lecture, description, exemplifications by using multimedia tools	
11) The mean curvature and the total curvature. The Teorema Egregium ([2] pag.199-206)	Lecture, description, exemplifications by using multimedia tools	
12) Minimal surfaces and surfaces of constant curvature ([2] pag. 199-206)	Lecture, description, exemplifications by using multimedia tools	
13) The Darboux Frame. The Darboux formulae ([2] pag. 223-225)	Lecture, description, exemplifications by using multimedia tools	
14) The geodesic curvature and torsion. Geodesic lines ([2] pag. 214-222)	Lecture, description, exemplifications by using multimedia tools	

Bibliography

1. BLAGA A. PAUL, Lectures on Classical Differential Geometry, Editura RISOPRINT, Cluj-Napoca, 2005

2. ENGIȘ P., ȚARINĂ M., Curs de Geometrie Diferențială, Cluj-Napoca, 1985
3. FEDENKO A. Recueil d'exercices de geometrie differentielle, Ed. MIR, Moscou 1982
4. MURGULESCU E., col., Geometrie analitică si diferențială, Editura Didactică si Pedagogică, București, 1965.
5. MURGULESCU E., col., Geometrie analitică in spațiu si geometrie diferențială, Culegere de probleme, vol. 2 Ed. Didactică si Pedagogică, București.
6. PINTEA C., Geometrie, Presa Universitara Clujeana, 2001.
7. TEODORESCU I.D., Geometrie Superioară, Ed. Didactică si Pedagogică, București, 1970
8. TEODORESCU I.D., TEODORESCU S.D., Culegere de probleme de Geometrie Superioară, Ed. Didactică și Pedagogică, București, 1975

8.2 Seminar / laboratory	Teaching methods	Remarks
1) problems [3]pag.30-35	Description, explanation, independent and/or team study	
2) problems :([2] pag.166-171)	Description, explanation, independent and/or team study	
3) problems: [2] pag. 166-171,[3] pag. 55-57	Description, explanation, independent and/or team study	
4) problems: [2] pag. 166-171)	Description, explanation, independent and/or team study	
5) problems: [2] pag. 166-171, [3] pag.47-48	Description, explanation, independent and/or team study	
6) problems: [2] pag. 166-171, [3] pag.40-42	Description, explanation, independent and/or team study	
7) problems :[2] pag.233-240 , [3] pag.63-68	Description, explanation, independent and/or team study	
8) problems: [2] pag.233-240	Description, explanation, independent and/or	

	team study	
9) problems: [2] pag.233-240, [3] pag.77-84	Description, explanation, independent and/or team study	
10) problems:[2] pag.233-240, [3] pag.77-84	Description, explanation, independent and/or team study	
11) problems: [2] pag.233-240, [3] pag.77-84	Description, explanation, independent and/or team study	
12) problems: [2] pag.233-240, [3] pag.77-84	Description, explanation, independent and/or team study	
13) problems: [2] pag.233-240	Description, explanation, independent and/or team study	
14) problems: [2] pag.233-240, [3] pag.88-91	Description, explanation, independent and/or team study	

Bibliography

1. BLAGA A. PAUL, Lectures on Classical Differential Geometry, Editura RISOPRINT, Cluj-Napoca, 2005
2. ENGIȘ P., ȚARINĂ M., Curs de Geometrie Diferentiala, Cluj-Napoca, 1985
3. FEDENKO A. Recueil d'exercices de geometrie differentielle, Ed. MIR, Moscou 1982
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5. MURGULESCU E., col., Geometrie analitica in spatiu si geometrie diferentiala, Culegere de probleme, vol. 2 Ed. Didactica si Pedagogica, Bucuresti.
6. PINTEA C., Geometrie, Presa Universitara Clujeana, 2001.
7. TEODORESCU I.D., Geometrie Superioara, Ed. Didactica si Pedagogica, Bucuresti , 1970
8. TEODORESCU I.D., TEODORESCU S.D., Culegere de probleme de Geometrie Superioara, Ed. Didactica si Pedagogica, Bucuresti, 1975

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

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	The completeness and correctness of the knowledge, the degree of assimilation of the specific language	Two written partial exams	75%
10.5 Seminar/lab activities	The ability to use the assimilated knowledge in problem solving, originality	Active attendance, solving the homeworks	25%
10.6 Minimum performance standards			
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Date

April 30, 2018

Signature of course coordinator

Assoc. Prof. Paul Blaga

Signature of seminar coordinator

Assoc. Pr. Paul Blaga

Date of approval

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Signature of the head of department

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