SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş Bolyai University
1.2 Faculty	Faculty of Mathematics and Computer Science
1.3 Department	Department Mathematics
1.4 Field of study	Mathematics
1.5 Study cycle	Bachelor
1.6 Study programme / Qualification	Computer Science

2. Information regarding the discipline

2.1 Name of the discipline	Geometry						
2.2 Course coordinator	Assoc.Prof.PhD. Cornel Pintea						
2.3 Seminar coordinator	Assoc.Prof.PhD. Cornel Pintea						
2.4. Year of study	**1**	2.5 Semester	**2**	2.6. Type of evaluation	**C**	2.7 Type of discipline	**Compulsory**

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

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar	2 sem
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar	56
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					30
Additional documentation (in libraries, on electronic platforms, field documentation)					14
Preparation for seminars/labs, homework, papers, portfolios and essays					24
Tutorship					14
Evaluations					12
Other activities:					-

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	• Elementary abstract algebra
4.2. competencies	• Competencies of logic reasonings and in using the knowledges of the above mentioned curricula.

5. Conditions (if necessary)

5.1. for the course	• The classroom should be gifted with a board and video projector. The attendance is strongly recommended.
5.2. for the seminar /lab activities	• The classroom should be gifted with a board. The attendance is strongly recommended.

6. Specific competencies acquired

Professional competencies	• Knowledge, understanding and use of basic objects and concepts of analytic geometry. • Ability for elementary algebraic calculations to be used for vector algebra. • Ability to work independently and/or in a team in order to solve problems in defined professional contexts.
Transversal competencies	• Ability to distinguish the objects of analytic geometry in other contexts, such as other courses and real life problems. • Ability to apply the knowledge acquired within the course of analytic geometry to understand other courses which require such knowledge. • Ability to model phenomena using the objects of analytic geometry.

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

7.1 General objective of the discipline	• Ability to distinguish the objects of analytic geometry in different contexts. • Ability to reduce conics and quadrics to their reduced form by using the method of eigenvectors and eigenvalues. • To get hold of the fundamental theoretical results of analytic geometry.
7.2 Specific objective of the discipline	• The students are expected to acquire the ability to recognize the objects of analytic geometry in different contexts such as other courses studied by themselves which require such knowledge. • The students are expected to cultivate their abilities acquired within the course of analytic geometry in order to connect and apply them within some other courses studied by themselves which require such knowledge. • To use the knowledge acquired within the couse of analytic geometry in order to apply them in real life problems which lend oneself to analytic approaches.

8. Content

8.1 Course	Teaching methods	Remarks
1. Vectors and operations with vectors.	Exposure: description, explanation, examples	One lecture
2. Reference sytems. Systems of coordinates	Exposure: description, explanation, examples	One lecture
2. Various equations of lines and planes	Exposure: description,	Two lectures

	explanation, examples	
3. Vector products (dot product, cross product, triple scalar product)	Exposure: description, explanation, examples	Two lectures
4. Conics	Exposure: description, explanation, examples, proofs, debate, dialogue	Two lectures
5. Quadrics	Exposure: description, explanation, examples, proofs, debate, dialogue	Two lectures
6. Generated surfaces (cylindrical surfaces, conic surfaces, conoidal surfaces, revolution surfaces)	Exposure: description, explanation, examples.	Two lectures
7. Geometric Transformations (reflexions, translations, scalings, projections)	Exposure: description, explanation, examples, proofs	Two lectures

Bibliography

1. Andrica, D., Țopan, L., Analytic Geometry, Cluj University Press, 2004.

2. Eggerton, P.A., Hall, W.S., Computer Graphics. Mathematical First Steps, Prentice Hall, 1999.

3. Pintea, C., Geometrie. Elemente de geometrie analitică. Elemente de geometrie diferențială a curbelor și suprafețelor, Presa universitară clujeană, 2001.

4. Smaranda, D., Soare, N., Transformări geometrice, Editura Academiei RSR, București, 1988.

8.2 Seminar	Teaching methods	Remarks
1. Problems on vector algebra with applications in classical geometry.	Explation, dialogue, solving problems	One tutorial
2. Problems involving various equations of lines and planes	Dialogue, debate, examples, solving problems	Two tutorials
3. Problems on vector products (dot product, cross product, triple scalar product)	Dialogue, debate, case studies, examples, solving problems	Two tutorials
4. Problems on associated geometric objects to conics, such as tangent lines and normal lines.	Dialogue, debate, examples, solving problems	Two tutorials
5. Reducing conics to their canonical form by using the method of eigenvalues and eigenvectors.	Dialogue, debate, examples, solving problems	One tutorial
6. Problems on associated geometric objects to quadrics, such as tangent planee and normal line.	Dialogue, debate, examples, solving problems	One tutorial
Reducing quadrics to their canonical form by using the method of eigenvalues and eigenvectors.	Dialogue, debate, examples, solving problems	One tutorial
7. Examples of cylindrical surfaces, conic surfaces, conoidal surfaces and of revolution surfaces.	Dialogue, debate, examples, solving problems	Two tutorials
8. Problems on reflexions, translations, scalings, projections with applications to classical geometry.	Dialogue, debate, examples, solving problems	Two tutorials

Bibliography

1. Andrica, D., Țopan, L., Analytic Geometry, Cluj University Press, 2004.

2. Eggerton, P.A., Hall, W.S., Computer Graphics. Mathematical First Steps, Prentice Hall, 1999.

3. Nicolescu, L., Boskoff, V., Probleme practice de geometrie, Ed. Tehnica, Bucureşti, 1990.

4. Pintea, C., Geometrie. Elemente de geometrie analitică. Elemente de geometrie diferenţială a curbelor şi suprafeţelor, Presa universitară clujeană, 2001.

5. Smaranda, D., Soare, N., Transformări geometrice, Editura Academiei RSR, Bucureşti, 1988.

6. Bercovici, M., Rimer, S., Triandaf, A., Culegere de probleme de geometrie analitică şi diferenţială, Editura didactică şi pedagogică, Bucureşti, 1973.

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

- Generally speaking, Geometry, and Analytic geometry in particular, may help the individuals to build a logical thinking based on intuition. This may help to understand other mathematical fields or even other sciences. Also, geometry cultivate the practical skils, from a theoretical point of view, extremely necessary in real life problems.
- The course exists in the studying program of all major universities in Romania and abroad.
- The content of the course is suitable to build a strong mathematical background.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	◆The students are expected to know the basic concepts and results of analytic geometry; ◆ The students are expected to apply the course concepts in real life situations	Written exam at the and of the semester consisting in theoretical questions alongside applications and problems.	70%
10.5 Seminar	◆ The ability to solve problems which are closed to those solved during the tutorials. ◆Good students are expected to solve problems which require deep knowledge of the important results presented at the course.	The grade for the tutorial component will consist partly in the grade of a quizz and partly in a grade for the the student's activity within the tutorial during the whole semester .	30%

10.6 Minimum performance standards
➢ At least grade 5 (from a scale of 1 to 10) at both written exam and laboratory work.

Date	Signature of course coordinator	Signature of seminar coordinator
.....	Assoc.Prof.PhD. Cornel PINTEA	Assoc.Prof.PhD. Cornel PINTEA
Date of approval		Signature of the head of department
.....		Prof. Octavian AGRATINI