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| O imagine care conține siglă, simbol, Font, Grafică  Descriere generată automat | MINISTERUL EDUCAŢIEI **UNIVERSITATEA „AUREL VLAICU“ DIN ARAD**310130 Arad, B-dul Revolutiei nr. 77, P.O. BOX 2/158 AR *Tel.: 0040-257- 283010; fax. 0040-257- 280070*  [http://www.uav.ro](http://www.uav-arad.go.ro)*;* e-mail: rectorat@uav.ro |

**Operator de date cu caracter personal nr. 2929**

**SYLLABUS**

1. **Study programme**

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| 1.1. Higher education institution | **„Aurel Vlaicu” University of Arad** |
| 1.2. Faculty | **of Exact Sciences** |
| 1.3. Department | **Department of Mathematics and Computer Science** |
| 1.4. Field of study | **Mathematics** |
| 1.5. Study level | **2024-2025** |
| 1.6. Ciclul de studii | **Bachelor** |
| 1.7. Study programme / Qualification | **Mathematics and Computer Science** |
| 1.8. Form of education | **Full – Time study** |

1. **Course details**

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| 2.1. Name of the course | **GlCF3O01 Geometry** |
| 2.2. Course coordinator | **Dr. Popa Lorena Camelia** |
| 2.3. Seminar/laboratory/project coordinator | **Dr. Popa Lorena Camelia** |
| 2.4. Study year | **2** |
| 2.5. Semester | **1** |
| 2.6. Evaluation type | **Es** |
| 2.7. Course type | **Ob** |

1. **Estimated total time (hours per semester)**

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| 3.1. Hours per week | **4** |
| 3.2. Lecture hours per week | **2** |
| 3.3. Seminar/laboratory/project hours per week | **2** |
| 3.4. Total hours per curriculum | **56** |
| 3.5. Lecture hours per semester | **28** |
| 3.6. Seminar/laboratory/project hours per semester | **28** |
| Time division [hrs] | |
| 3.4.1. Independent study from textbooks, course support, bibliography and notes | **35** |
| 3.4.2. Additional reading (libraries, specialized electronic platforms and field research) | **25** |
| 3.4.3. Preparing of seminars/laboratories/projects, homework, papers, portfolios and essays | **25** |
| 3.4.4. Tutorial coaching | **5** |
| 3.4.5. Examinations | **4** |
| 3.4.6. Other activities | **0** |
| 3.7. Total individual study hours | **94** |
| 3.8. Total hours per semester | **150** |
| 3.9. Number of ECTS credits | **6** |

1. **Prerequisites** (if applicable)

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| 4.1. Curriculum related | Linear algebra |
| 4.2. Competence related | Laboratory room, properly equipped: computers, connection to Internet |

1. **Conditions** (if applicable)

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| 5.1. for the lecture |  |
| 5.2. for the seminar |  |
| 5.3. for the laboratory |  |
| 5.4. for the project |  |

1. **Specific educational objectives (competences to be acquired)**

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| 6.1. Competenţe profesionale | **C1.** Working with mathematical concepts and methods.  **C2.** Mathematical processing of data, analysis of phenomena and processes.  **C4.** Conceiving models for describing phenomena. |
| 6.2. Competenţe transversale | **CT1.** Applying the rules of organized and efficient work, of responsibie attitudes towards teaching-scientific field, to value the own creative potential, while respecting the principles and norms of professional ethics.  **CT2.** Efficient conduct of team activities. |

1. **Course outcomes (resulting from the specific educational objectives to be acquired)**

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| 7.1. General outcomes | **-The student should know and understand the basic notions of analytical geometry.**  **- The student should develop his skills to correctly apply the accumulated theoretical knowledge to solve problems.**  **- The student must train and develop his capacity for analysis and synthesis.** |
| 7.2. Specific outcomes | **-The student is able to demonstrate that he has acquired sufficient knowledge to understand notions such as: point, line, plane, conic, quadric, landmark, angle, distance.**  **- The student is able to apply vector calculus from Euclidean space E2 and E3 in geometry, determine intersections, projections and angles of linear varieties, determine the equations of ruled surfaces and of rotation, study a conic on the general equation, determine a sphere by geometric conditions, to study a quadric, and their intersection with planes.**  **- The student is able to select and correctly apply the basic methods and principles learned in solving analytical geometry problems.**  **- The student can create projects for the mathematical modeling of a concrete problem.** |

1. **Outline** (if applicable)

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| 8.1 Lecture Outline | Teaching methods | Remarks |
| 1. Euclidean affine spaces 1.1 Euclidean affine spaces E2 and E3. 1.2 Products of vectors. 1.3 Applications of vector calculus in geometry. 1.4 Coordinate systems in Euclidean affine spaces E2 and E3. 1.5 Cartesian landmark changes in E2 and E3. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 1 - 8 hours |
| 1. The line and the plane in E3 2.1 Analytical representations of the   line and the plane. 2.2 Intersections, projections and angles of varieties. 2.3 The distance from a point to a manifold. 2.4 Common perpendicularity of two straight lines. The distance between two straight lines. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 2 - 8 hours |
| 1. Ruled and rotating surfaces 3.1 Cylindrical surfaces. 3.2. Conical surfaces. 3.3. Conoid surfaces. 3.4. Surfaces of rotation. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 3 - 2 hours |
| 1. The study of conics on the general equation 4.1. Conics on reduced equations. 4.2. Reduction of the general equation of a conic to the canonical equation. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 1 - 2 hours |
| 1. Sphere. Quadriceps 5.1. Determination of the sphere by geometric conditions. The intersection of the sphere with a plane. 5.2. Quadriceps on reduced equations. 5.3. Reducing the general equation of a quadric to the canonical equation. 5.4. Intersection of quadrics with planes. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 1 - 8 hours |
| 8.2 Lecture References  **1. Popa L., Geometrie, Suport de curs și seminar- platforma SUMS, 2024**  **2. Popa L., Geometrie, Editura Mirton, 2020.**  **3. Moț G., Popa L., Algebră liniară, geometrie analitică și geometrie diferențială, Editura Universității “Aurel Vlaicu”,2015.**  **4. Arieşanu C., Gîrban A. , Şapte lecţii de geometrie analitică şi diferenţială în spaţiul euclidian 3D, Ed. Politehnica,Timişoara 2008.**  **5. Boja N. , Geometrie analitică şi diferenţială cu aplicaţii, Ed. Politehnica, Timişoara 2008.** | | |

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| 8.3 Seminar Outline | Teaching methods | Remarks |
| 1. Euclidean affine spaces 1.1 Euclidean affine spaces E2 and E3. 1.2 Products of vectors. 1.3 Applications of vector calculus in geometry. 1.4 Coordinate systems in Euclidean affine spaces E2 and E3. 1.5 Cartesian landmark changes in E2 and E3. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 1 - 8 hours |
| 1. The line and the plane in E3 2.1 Analytical representations of the   line and the plane. 2.2 Intersections, projections and angles of varieties. 2.3 The distance from a point to a manifold. 2.4 Common perpendicularity of two straight lines. The distance between two straight lines. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 2 - 8 hours |
| 1. Ruled and rotating surfaces 3.1 Cylindrical surfaces. 3.2. Conical surfaces. 3. 3 Conoid surfaces. 3.4. Surfaces of rotation. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 3 - 2 hours |
| 1. The study of conics on the general equation 4.1. Conics on reduced equations. 4.2. Reduction of the general equation of a conic to the canonical equation. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 1 - 2 hours |
| 1. Sphere. Quadriceps 5.1. Determination of the sphere by geometric conditions. The intersection of the sphere with a plane. 5.2. Quadriceps on reduced equations. 5.3. Reducing the general equation of a quadric to the canonical equation. 5.4. Intersection of quadrics with planes. | Participatory lecture, debate, interactive exposition, documentation on the web, exemplification, problematization | Chapter 1 - 8 hours |
| 8.4 Seminar References  **1. Popa L., Geometrie, Suport de curs și seminar- platforma SUMS, 2024**  **2. Popa L., Geometrie, Editura Mirton, 2020.**  **3. Moț G., Popa L., Algebră liniară, geometrie analitică și geometrie diferențială, Editura Universității “Aurel Vlaicu”,2015.**  **4. Arieşanu C., Gîrban A. , Şapte lecţii de geometrie analitică şi diferenţială în spaţiul euclidian 3D, Ed. Politehnica,Timişoara 2008.**  **5. Boja N. , Geometrie analitică şi diferenţială cu aplicaţii, Ed. Politehnica, Timişoara 2008.** | | |
| 8.5 Laboratory Outline | Teaching methods | Remarks |
| 8.6 Laboratory Outline | | |
| 8.7 Project Outline | Teaching methods | Remarks |
| 8.8 Project Outline | | |

1. Correlation of course outline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The content of the discipline is consistent with what is done in other university centers in the country and abroad. In order to better adapt the content of the subject to the demands of the labor market, meetings were held both with representatives of the business environment and with mathematics and computer science teachers from pre-university education of Arad.

1. **Evaluation / Grading** (if applicable)

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| Activity type | Evaluation criteria | Evaluation methods | Percentage of the final grade |
| 10.1. Lecture | - correctness and completeness of knowledge;  - logical coherence; - degree of assimilation of specialized language;  - criteria aimed at attitudinal aspects: conscientiousness, interest in individual study.  - correctness and completeness of knowledge;  - logical coherence; - degree of assimilation of specialized language;  - criteria aimed at attitudinal aspects: conscientiousness, interest in individual study. | Written assessment (final in the exam session)  Written assessment (during the semester): partial exam  Active participation in classes. | 10%  10%  10% |
| 10.2.  Seminar | **- correctness and completeness of knowledge;**  **- logical coherence;**  **- degree of assimilation of specialized language;**  **- criteria aimed at attitudinal aspects: conscientiousness, interest in individual study.** | Written assessment (final in the exam session)  Written assessment (during the semester): partial exam  Active participation in seminars | 30%  30%  10% |
| 10.3.  Laboratory |  |  |  |
| 10.4. Project |  |  |  |
| 10.5 Minimal performance standard  **Knowing the fundamental elements of theory, solving a simple application.** | | | |
| |  |  |  |  | | --- | --- | --- | --- | | Course coordinator | Seminar/laboratory/project coordinator | Head of the Department | Dean | | Lect.univ.dr. Lorena Camelia POPA | Lect.univ.dr. Lorena Camelia POPA | Lect.univ.dr. Lorena Camelia POPA | Prof.univ.dr. Sorin-Florin NĂDĂBAN | | | | |