



MINISTERUL EDUCAȚIEI
UNIVERSITATEA „AUREL VLAICU” DIN ARAD
310130 Arad, B-dul Revoluției nr. 77, P.O. BOX 2/158 AR
Tel : 0040-257- 283010; fax. 0040-257- 280070
<http://www.uav.ro>; e-mail: rectorat@uav.ro
Operator de date cu caracter personal nr.2929

SUBJECT SHEET

1. Program Data

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. Academic year	2024-2025
1.6. Cycle of studies	License
1.7. Specialization / Study Program	Computer Science Mathematics
1.8. Form of education	Full-time education (IF)

2. Discipline Data

2.1. Name of the discipline	GICS5002 Numerical Analysis
2.2. Education Plan Holder	dr. Deac Dan-Stelian
2.3. Assistant	dr. Deac Dan-Stelian
2.4. Year of study	3
2.5. Semester	1
2.6. Type of assessment	ES
2.7. Discipline regime	Ob

3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	4
3.2. Hours of classes per week	2
3.3. Seminar/laboratory/project hours per week	2
3.4. Total hours of the curriculum	56
3.5. Course hours per semester	28
3.6. Seminar/laboratory/project hours per semester	28
Time Pool Distribution [Hours]	
3.4.1. Study by textbook, course material, bibliography and notes	28
3.4.2. Additional documentation in the library, on specialized electronic platforms and in the field	9
3.4.3. Preparation of seminars/laboratories, assignments, papers, portfolios and essays	28
3.4.4. Tutoring	4
3.4.5. Examinations	4
3.4.6. Other activities ...	0
3.7. Total hours of individual study	69
3.8. Total hours per semester	125
3.9. Number of credits	5

4. Preconditions (where applicable)

4.1. Curriculum prerequisites	Mathematical Analysis on R and R, Real Analysis, Linear Algebra, Differential Geometry, Partial Differential Equations, Object-Oriented ProgrammingAnalytical, Equations
4.2. Competence preconditions	Computer operation, text writing with Microsoft Word.

5. Necessary conditions (where applicable)

5.1. Conditions for the course	Video projector, whiteboard, computers with Mathcad installed
5.2. Conditions for the seminar	Video projector, whiteboard, computers with Mathcad installed
5.3. Conditions for conducting the laboratory	
5.4. Conditions for carrying out the project	

6. Specific competences acquired (where applicable)

6.1. Professional competences	C1. Operating with mathematical notions and methods. C2. Mathematical data processing, analysis and interpretation of phenomena and processes. C3. Developing and analyzing algorithms for problem solving.
6.2. Cross-cutting competency	CT1. Applying the rules of rigorous and efficient work, manifesting responsible attitudes towards the scientific and didactic field, for the optimal and creative capitalization of one's own potential in specific situations, in compliance with the principles and norms of professional ethics. CT3. Efficient use of information sources and communication resources and assisted professional training, both in Romanian and in an international language.

7. Objectives of the discipline (where applicable)

7.1. General objective of the discipline	Formation of mathematical calculation skills, mathematical modeling, differential equation solving, numerical method programming, mathematical simulation of phenomena.
7.2. Specific objectives	These skills are necessary to be able to do in scientific research. The knowledge can be used in the master's and doctoral study cycles, in disciplines such as: assisted design, strength calculation, modeling and mathematical simulation.

8. Contents (where applicable)

8.1 Course Content	Teaching methods	Observations
1) Mathcad Prime 8 Window and Menus	Interactive Exhibit Heuristic Conversation	2 hours
2) Calculation of mathematical expressions	interactive exhibition problematization modeling	2 hours
3) Elements of mathematical analysis in R^n a) Partial derivatives b) Generalized integrals c) Double and triple integrals	interactive exhibition exemplification	6 hours
4) Elements of algebra a) Matrix equations b) Solving systems of nonlinear equations c) Eigenvalues and eigenvectors	interactive exhibition exemplification	6 hours
5) 3D graphics a) Curves in space b) Minimum surfaces c) Bodies	interactive exhibition problematization exemplification	6 hours
6) Optimization: a) Linear programming b) Nonlinear programming with constraints c) Nonlinear programming without constraints	interactive exhibition problematization exemplification	6 hours
8.2 Course Bibliography 1. Cira O., Applications, problems and exercises solved with Mathcad, MatrixRom Publishing House, Bucharest 2010 2. Deac D. , Numerical analysis. SUMS platform course support 3. Jalobeanu C., Introduction to Numerical Analysis - Theory, Algorithms, Applications, Blue Publishing House, Cluj-Napoca, 2009 4. Brent Maxfield, Essential Mathcad for Engineering, Science and Math, Second Edition, Academic Press, 2009 5. ***, Mathcad Prime 2.0 Curriculum Guide, Parametric Technology Corporation, 140 Kendrick Street, Needham, MA 02494 USA, August 2012 6. http://www.ptc.com/products/ptc-university/ 7. https://www.instructables.com/Mathcad-Basics/ 8. https://www.pdfdrive.com/mathcad-books.html		
8.3 Seminar Content	Teaching methods	Observations
1 Mathcad Prime 8 Window and Menus	Debate exercise	2 hours
2) Calculation of mathematical expressions	Exercise Application	2 hours
3) Elements of mathematical analysis in R^n a) Partial derivatives b) Generalized integrals c) Double and triple integrals	Exercise app	6 hours
4) Elements of algebra a) Matrix equations b) Solving systems of nonlinear equations c) Eigenvalues and eigenvectors	Exercise Application	6 hours
5) 3D graphics a) Curves in space b) Minimum surfaces c) Bodies	Application Modeling	6 hours
6) Optimization: a) Linear programming b) Nonlinear programming with constraints c) Nonlinear programming without constraints	Exercise app	6 hours

8.4 Seminar Bibliographies		
1. Cira O., Applications, problems and exercises solved with Mathcad, MatrixRom Publishing House, Bucharest 2010 2. Deac D. , Numerical analysis. SUMS platform course support 3. Jalobeanu C., Introduction to Numerical Analysis - Theory, Algorithms, Applications, Blue Publishing House, Cluj-Napoca, 2009 4. Brent Maxfield, Essential Mathcad for Engineering, Science and Math, Second Edition, Academic Press, 2009 5. ***, Mathcad Prime 2.0 Curriculum Guide, Parametric Technology Corporation, 140 Kendrick Street, Needham, MA 02494 USA, August 2012 6. http://www.ptc.com/products/ptc-university/ 7. https://www.instructables.com/Mathcad-Basics/		
8.5 Lab Content	Teaching methods	Observations
8.6 Laboratory bibliography		
8.7 Project Content	Teaching methods	Observations
8.8 Project Bibliography		

9. Corroborating/validating the contents of the discipline (where applicable)

The content of the discipline is in accordance with the content of similar disciplines in other university centers in the country and abroad. In order to better adapt the content of the discipline to the requirements of the labor market, meetings were held both with employers - representatives of the business environment and with mathematics and computer science teachers from the pre-university education in Arad.

10. Assessment (where applicable)

Activity Type	Evaluation criteria	Evaluation methods	Weight of the final grade
10.1. Course	Correctness and completeness of knowledge Logical coherence Degree of assimilation of specialized language Conscientiousness, interest for study	Free presentation of the student Evaluation conversation Oral quizzes. Active participation in courses.	50% 10%
10.2. Seminar	ability to operate with assimilated knowledge; conscientiousness, interest in study	Evaluation of a project along the way Active participation in laboratory applications	30% 10%
10.3. Laboratory			
10.4. Project			
10.5 Minimum Performance Standard			
Acquiring fundamental concepts, using specialized language, making a simple application			

Titular dr. Deac
Dan-Stelian

Assistant dr. Deac
Dan-Stelian

DEPARTMENT DIRECTOR
Reader Popa Lorena

DEAN
Prof.univ.dr. Sorin-Florin NĂDĂBAN