MINISTERUL EDUCAŢIEI
UNIVERSITATEA „AUREL VLAICU" DIN ARAD
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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	**Computer science**
1.5. Academic year	**2024-2025**
1.6. Cycle of studies	**License**
1.7. Specialization / Study Program	**Computer science**
1.8. Form of education	**Full-time education (IF)**

2. Discipline Data

2.1. Name of the discipline	**GlAS2O08 Numerical Calculation**
2.2. Education Plan Holder	**dr. Deac Dan-Stelian**
2.3. Assistant	**dr. Deac Dan-Stelian**
2.4. Year of study	**1**
2.5. Semester	**2**
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	**3**
3.2. Hours of classes per week	**2**
3.3. Seminar/laboratory/project hours per week	**1**
3.4. Total hours of the curriculum	**42**
3.5. Course hours per semester	**28**
3.6. Seminar/laboratory/project hours per semester	**14**
	Time Pool Distribution [Hours]
3.4.1. Study by textbook, course material, bibliography and notes	**18**
3.4.2. Additional documentation in the library, on specialized electronic platforms and in the field	**15**
3.4.3. Preparation of seminars/laboratories, assignments, papers, portfolios and essays	**15**
3.4.4. Tutoring	**10**
3.4.5. Examinations	**4**
3.4.6. Other activities ...	**0**
3.7. Total hours of individual study	**58**
3.8. Total hours per semester	**100**
3.9. Number of credits	**4**

4. Preconditions (where applicable)

4.1. Curriculum prerequisites	**Mathematical Analysis on R and R, Real Analysis, Linear Algebra, Analytic Geometry, Differential Equations, Partial Differential Equations, Object-Oriented Programming**
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 Prime 8 installed**
5.2. Conditions for the seminar	
5.3. Conditions for conducting the laboratory	**Video projector, whiteboard, computers with Mathcad Prime 8 installed**
5.4. Conditions for carrying out the project	

6. Specific competences acquired (where applicable)

6.1. Professional competences	**C2. Development and maintenance of computer applications.** **C3. Use of IT tools in an interdisciplinary context C4. Use of the theoretical foundations of computer science and formal models**
6.2. Cross-cutting competency	**CT1. Applying the rules of organized and efficient work, of responsible attitudes towards the didactic-scientific field, for the creative capitalization of one's own potential, with respect for the didactic-scientific field, for the creative capitalization of one's own potential, with the observance of the principles and norms of professional ethics.** **CT2. To carry out efficiently the activities organized in an interdisciplinary group and to develop the empathic capacities of inter-personal communication, relating and collaboration with various groups.** **CT3. The use of efficient methods and techniques of learning, information, research and development of the capacities to capitalize on knowledge, to adapt to the requirements of a dynamic society and to communicate 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, programming of numerical methods, mathematical simulation of phenomena.**
7.2. Specific objectives	**These skills are necessary in scientific research. The knowledge can be used in the master's and doctoral study cycles.**

8. Contents (where applicable)

8.1 Course Content	Teaching methods	Observations
1. Mathcad Window and Menus	Interactive Exhibit Heuristic Conversation	2 hours
The Mathcad Palace	interactive exhibition exemplification	4 hours
3. Calculation of mathematical expressions	interactive exhibition problematization modeling	4 hours
4. Representations of 2D functions	interactive exhibition exemplification	2 hours
5. 3D function representations	interactive exhibition exemplification	2 hours
6. Solving linear systems, mathematical programming problems	interactive exhibition problematization exemplification	2 hours
7. Solving algebraic equations	interactive exhibition problematization exemplification	2 hours
8. Solving Transcendent Equations and Nonlinear Systems	interactive exhibition problematization exemplification	2 hours
Interpolation and extrapolation	interactive exhibition problematization exemplification	2 hours
9. Matrix operations	Interactive Exhibition Exemplification	2 hours
10. Applications of differential calculus	interactive exhibition problematization exemplification	2 hours
11. Numerical Solving of Differential Equations	interactive exhibition exemplification	2 hours

8.2 Course Bibliography

1. Cira O., Applications, problems and exercises solved with Mathcad, MatrixRom Publishing House, Bucharest 2010
2. Deac D. , Numerical calculus. 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. htpp://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
8.4 Seminar Bibliographies		
8.5 Lab Content	Teaching methods	Observations

1 Mathcad window and menus	Debate exercise	Minute
2.3 Mathcad Palace	Exercise Application	Minute
4.5 Calculation of mathematical expressions	Exercise app	2 hours
6 Representations of 2D functions	Exercise Application	Minute
7 3D Function Representations	Application Modeling	Minute
8 Solving linear systems, mathematical programming problems	Exercise app	Minute
9 Solving algebraic equations	Exercise app	Minute
10 Solving Transcendent Equations and Nonlinear Systems	Exercise app	Minute
10 Solving Transcendent Equations and Nonlinear Systems	Exercise app	Minute
11 Interpolation and extrapolation	Exercise app	Minute
12 Die Operations	Exercise Application	Minute
13 Applications of differential calculus	Exercise Application	Minute
14 Numerical Solving of Differential Equations	Exercise app	Minute

8.6 Laboratory bibliography

1. Cira O., Applications, problems and exercises solved with Mathcad, MatrixRom Publishing House, Bucharest 2010
2. Deac D. , Numerical calculus. 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. htpp://www.ptc.com/products/ptc-university/
7. https://www.instructables.com/Mathcad-Basics/
8. https://www.pdfdrive.com/mathcad-books.html

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			
10.3. Laboratory	**ability to operate with assimilated knowledge; conscientiousness, interest in study**	Evaluation of a project along the way Active participation in laboratory applications	30% 10%
10.4. Project			
10.5 Minimum Performance Standard **Acquiring fundamental concepts, using specialized language, making a simple application**			

Titular dr. Deac   Assistant dr. Deac   DEPARTMENT DIRECTOR   DEAN
Dan-Stelian   Dan-Stelian   Reader Popa Lorena   Prof.univ.dr. Sorin-Florin NĂDĂBAN