SYLLABUS

1. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Data about the discipline

2.1 Course Title:	MECHANICAL
2.2 Course Lecturer:	Assoc. Prof. Lavinia Ioana CULDA
2.3 Seminar Instructor:	Assoc. Prof. Lavinia Ioana CULDA
2.4 Year of Study:	1
2.5 Semester	1
2.6 Type of Assessment:	EXAMINATION
2.7 Course Status:	DS-compulsory

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

3.1 Hours per week:	3	of which 3.2 lecture	2	3.3 Seminar	1
3.4 Total hours in the study plan	42	of which 3.5 lecture	28	3.6 Seminar	14
Time allocation:					Hours
Study based on course materials, bibliography					15
Additional documentation in library, specialized databases, or field work					15
Preparation for seminars/labs, essays, portfolios					10
Tutoring					8
Examinations					8
Other activities...					2
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 of curriculum	Elements of mathematics, physics and technical drawing
4.2 of competences	Calculation and operating skills with simple geometric and algebraic notions.

5. Conditions (where applicable)

5.1 of conducting the course	Classroom, equipped with laptop, digital whiteboard
5.2 of conducting the seminar	Laboratory room, equipped with laptop, digital whiteboard. Layouts

6. Specific Competencies Acquired

Professional Competencies	C3. Include new products in the production process – Help integrate new systems, products, methods, and components into the production line. Ensure that workers in production are properly trained and comply with new requirements.

Transversal Competencies:	CT3. Think analytically.

7. Learning Outcomes

Knowledge	He has knowledge of the operation of some methods, algorithms, equipment. Identify how certain products can be included in production. It processes information, ideas and concepts. Solve problems. Think creatively and innovatively.
Skills	Documents and implements procedures for introducing a new product into the manufacturing flow. It provides operator training and equipment adaptation to the requirementsof the new product. Think analytically. Think critically. Think creatively.
Responsibilities and autonomy	Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. Can work independently or in a team to implement and test automation solutions in a real professional environment. Has the ability to manage technical projects responsibly and on time. Approach problems critically.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	Know the functionalities of the main technical drawing programs. Understand the rules and standards of graphic representation in technical drawing. Know the symbols, conventions and dimensions used in the technical drawing. Knows methods of solving engineering problems (e.g. cause analysis, brainstorming, decision-making methods). Understand technological processes and technical system constraints. Know mathematical concepts applicable in engineering: linear algebra, differential and integral calculus, differential equations. Understand the mathematical modeling of physical and technical phenomena. Know the fundamental principles of operation of mechanical, electrical and hydraulic systems. Understand the interaction of components in a complex technical system. Know the sources of available technical information: databases, catalogues, manufacturers' sheets, specialized publications. Understand the criteria for selecting resources relevant to a particular project.
8.2 Specific objectives	Analyze and understand technical drawings for mechanical components and assemblies. Apply analytical methods to solve engineering problems. Interpret the results of mathematical calculations in the technical context. It analyzes the functioning of technical systems starting from theoretical principles. Evaluates the applicability of different technical solutions in engineering projects.

	It identifies and extracts essential information from technical sources to support engineering decisions. Assess the credibility and timeliness of the sources used.
	He works responsibly in making drawings within the design team. Approach problems with responsibility and critical thinking. Collaborate with team members to solve complex situations. It rigorously applies the calculation methods, ensuring the correctness of the results. Use calculations as support for technical decision-making. Argue technical decisions based on sound engineering principles. Actively participates in the functional analysis of technical systems. Apply the information obtained in a critical and reasoned way in the engineering activity. Demonstrates autonomy in documentation and continuous self-training.

9. Contents

9.1 Course	**Teaching methods**	**Observations**
STATIC	Participatory lecture, debate, exposition, problematization, demonstration, modeling, study by discovery, bibliographic study, solutions of exercises and problems, practical works.	
Introduction to technical mechanics. Vector systems		2 hours
Force. Force systems. Reduction of force systems		2 hours
Material Point Statics		2 hours
Rigid Solid Statics		2 hours
CINEMATICS		
Material Point Kinematics		2 hours
The particular movements of the material point		2 hours
Rigid solid kinematics		2 hours
Translational motion, rotation, rototranslation, and parallel plane		2 hours
Kinematics of the relative motion of the material point		2 hours
DYNAMICS		
Dynamics of the material point. Fundamentals of the dynamics of the material point		2 hours
General Theorems in Material Point Dynamics. Dynamics of the relative motion of the material point		2 hours
Dynamics of Material Point Systems and Rigid Solid. Fundamentals		2 hours
General Theorems in the Dynamics of Material Point Systems and the Rigid Solid		2 hours
Elements of robotics		2 hours
	Total	28 hours
Course bibliography		

- Culda Lavinia Ioana – electronic course on the SUMS platform, 2025.
- Radu, I., Mechanics – Statics, UAV Lithography, 1996.
- Radu, I., Mechanics - Kinematics, UAV Lithography, 1995.
- Radu, I., Mecanica vol.1 – Statica , Ed. Mirton, Timisoara, 2001.

- Radu, I., Mechanics vol.2 – Cinematics, Ed. Mirton, Timisoara, 2001.
- Radu, I., Mecanica vol.3 – Dinamica , Ed. Mirton, Timisoara, 2000.
- Eugen Corduneanu, THEORETICAL MECHANICS, "GH. ASACHI" FROM IAȘI, Iași, 2018
- Radu Mircea MORARIU-GLIGOR, Nicolae HAIDUC, MECHANICS Course for Students, U.T. PRESS, CLUJ-NAPOCA, ISBN 978-606-737-251-9, 2017
- HUIDU TEODOR, Problems solved by mechanics, Macarie Publishing House, ISBN 973 - 8135 - 60 – 5, 2001
- Claudiu SCHONSTEIN, Gabriel FODOR, Theoretical Static and Kinematic Mechanics, UTPRESS, ISBN 978-606-737-606-7, Cluj - Napoca, 2022
- CULDA LAVINIA IOANA, ELENA MUNCUȚ, ATTILA. GERŐCS, Introductory notions in Industrial Robots, Gutemberg Univers Publishing House, Arad, pag.322, ISBN 978-606-675-365-4, 2023
- CULDA LAVINIA IOANA, Programming Machine Tools and Industrial Robots Course Notes, "Aurel Vlaicu" University Publishing House, page 104, ISBN 978-973-752-805-6, 2018

9.2 Seminar	**Teaching methods**	**Observations**
Static	Participatory lecture, debate, exposition, problematization, demonstration, modeling, study by discovery, bibliographic study, solutions of exercises and problems, practical works.	
Vector operations. Reduction of force systems		2 hours
Centers of gravity. Material Point Balance		2 hours
Cinematics		
The kinematics of the absolute motion of the material point in different coordinate systems. The particular movements of the material point.		2 hours
Movement of rigid solid		2 hours
Dynamics		
Mechanical work, power, efficiency, momentum, kinetic momentum, energy Mechanical;		2 hours
Elements of mechanics in robotics		4 hours
	Total	14 hours
Seminar bibliography		

- Culda Lavinia Ioana – electronic laboratory on the SUMS platform, 2025.
- Radu, I., Mechanics – Statics, UAV Lithography, 1996.
- Radu, I., Mechanics - Kinematics, UAV Lithography, 1995.
- Radu, I., Mecanica vol.1 – Statica , Ed. Mirton, Timisoara, 2001.
- Radu, I., Mechanics vol.2 – Cinematics, Ed. Mirton, Timisoara, 2001.
- Radu, I., Mecanica vol.3 – Dinamica , Ed. Mirton, Timisoara, 2000.
- Eugen Corduneanu, THEORETICAL MECHANICS, "GH. ASACHI" FROM IAȘI, Iași, 2018
- Radu Mircea MORARIU-GLIGOR, Nicolae HAIDUC, MECHANICS Course for Students, U.T. PRESS, CLUJ-NAPOCA, ISBN 978-606-737-251-9, 2017
- HUIDU TEODOR, Problems solved by mechanics, Macarie Publishing House, ISBN 973 - 8135 - 60 – 5, 2001
- Claudiu SCHONSTEIN, Gabriel FODOR, Theoretical Static and Kinematic Mechanics, UTPRESS, ISBN 978-606-737-606-7, Cluj - Napoca, 2022
- CULDA LAVINIA IOANA, ELENA MUNCUȚ, ATTILA. GERŐCS, Introductory notions in Industrial Robots, Gutemberg Univers Publishing House, Arad, pag.322, ISBN 978-606-675-365-4, 2023
- CULDA LAVINIA IOANA, Programming Machine Tools and Industrial Robots Course Notes, "Aurel Vlaicu" University Publishing House, page 104, ISBN 978-973-752-805-6, 2018

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

The content of the discipline is in accordance with the requirements of the bachelor's field, with what is studied in other university centers in the country and abroad. In order to better adapt to the requirements of the labour market, the The content of the discipline was met with representatives of the business environment, with employers, and and with teachers from technical university education.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Correctness of knowledge. Logical coherence. The degree of assimilation of the specialized language.	Criteria regarding attitudinal aspects: conscientiousness, interest in individual study, active participation in courses 20%. Written evaluation (during the semester or exam sessions) 60%.	80%
11.2 Seminar	The ability to operate with the assimilated knowledge. Criteria regarding attitudinal aspects: conscientiousness, interest in individual study. Ability to apply in practice.	Current written works: homework, projects 10%. Active participation in laboratory activities 10%.	20%
11.3 Minimum Performance Standard Minimum performance standard: knowledge of the fundamental elements of theory for each part and solving a simple application with a generalizing character.			

Date of completion 20.09.2025

Signature of the course holder Assoc.Prof.dr.eng. Lavinia Ioana Culda

Signature of the seminar instructor Assoc.Prof.dr.eng. Lavinia Ioana Culda

Date of approval in the department 26.09.2025

Signature of the department director

Assoc.Prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council 29.09.2026

Approval from the Dean

Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

11. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	COMPUTER-ASSISTED GRAPHICS II
2.2 Course Lecturer:	Senior Lecturer dr.eng. Andrei KOMJATY
2.3 Laboratory Instructor:	Senior Lecturer dr.eng. Andrei KOMJATY
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DF-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week:	4	of which 3.2 lecture	2	3.3 laboratory	2
3.4 Total hours in the study plan	56	of which 3.5 lecture	28	3.6 laboratory	28
Time allocation:					hours
Study based on course materials, bibliography					19
Additional documentation in library, specialized databases, or field work					19
Preparation for seminars/labs, essays, portfolios					19
Tutoring					8
Examinations					4
Other activities...					-
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 of curriculum	Computer programming and use.
4.2 of competences	Identification, definition, use of concepts in the field of engineering sciences; Use of principles and graphic tools for the description and presentation of elements in the field of engineering.

5. Conditions (where applicable)

5.1 of conducting the course	Classroom/amphitheatre, equipped with video projector, smart board, laptop.
5.2 of conducting the laboratory	Seminar/laboratory room, smart board, computer network with Solid Works.

6. Specific Competencies Acquired

Professional Competencies	C3. Incorporates new products into the production process - Helps integrate new systems, products, methods, and components into the production line. Ensures that production workers are properly trained and comply with new requirements.
Transversal Competencies:	CT1. Works in teams - Works confidently within a group, each doing their part in the service of the whole. CT2. Complies with regulations - Complies with the norms, regulations and guidelines relating to a specific field or sector and applies them in their daily work.

7. Learning outcomes

Knowledge	Has knowledge regarding the functioning of certain methods, algorithms, equipment. Identifies the way in which certain products can be included in production. Defines performance indicators.
Skills	Documents and implements procedures for introducing a new product into the manufacturing flow. Proposes and validates optimization solutions to reduce costs and increase efficiency.
Responsibilities and autonomy	Can work independently or in a team to implement and test automation solutions in a real professional environment. Has the ability to manage technical projects with responsibility and respect for deadlines.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1 General objective of the discipline	Knowledge and use of engineering concepts.
8.2 Specific objectives	Knowledge and understanding. Knowledge and understanding of the terms "Machine Organ", "Machine" as well as understanding the kinematic links that govern the functioning of any equipment. Explanation and interpretation. Correct and optimal correlation of the knowledge acquired in Drawing, Mechanics, Mechanisms and Strength of Materials. Acquiring the knowledge necessary to design an industrial product. Instrumental – applicative. Highlighting the demands as meaning and value, which act on machine organs at rest or in motion. Attitudinal. Manifesting positive and responsible attitudes towards the scientific and technical field. Optimal and creative use of one's own potential in scientific and technical activities. Involvement in the promotion and development of scientific and technical innovations.

	Participation in one's own professional and scientific development.

9. Course Content

9.1 Cours	Teaching methods	Observations
Solid Works – Parts and Assemblies	Participatory lecture, debate, exposition, problematization, demonstration, modeling, study through discovery, bibliographic study.	18 hours
Solid Works – Execution drawings		10 hours
Total		28 hours
Course bibliography:	[1] Komjaty A. – GAC/DTI Course – SUMS platform, 2025. [2] Barlida C. – Technical drawing and infographics, Politehnica University, Timisoara, 2014. [3] Practical tutor, Mechanical design technician, Politehnica University Bucharest, 2013. [4] SolidWorks user manuals, 2025.	

9.2 Laboratory	Teaching methods	Observations
Making parts	Conversation, Debate, Cooperative learning, Teamwork	16 hours
Making ensembles	Conversation, Debate, Cooperative learning, Teamwork	4 hours
Simple execution drawings, views	Conversation, Debate, Cooperative learning, Teamwork	2 hours
Complex execution drawings, sections, breaks	Conversation, Debate, Cooperative learning, Teamwork	4 hours
Exporting and printing execution drawings	Conversation, Debate, Cooperative learning, Teamwork	2 hours
	Total	28 hours
Laboratory bibliography	[1] Komjaty A. – GAC/DTI Course – SUMS platform, 2025. [2] Barlida C. – Technical drawing and infographics, Politehnica University, Timisoara, 2014. [3] Practical tutor, Mechanical design technician, Politehnica University Bucharest, 2013. [4] SolidWorks user laboratory, 2025.	

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

First of all, the university curriculum for a study program must be structured based on the proposals of the social partners of the higher education institution (especially research, design, construction, maintenance and exploitation companies), so that the graduate of the respective study program can easily enter the labor market, immediately after completing the first cycle of studies (bachelor's degree), thus being stimulated to participate in master's and doctoral courses, organized in collaboration with the social partners.

In the case of the study program: AIA, when drawing up the university curriculum, the standards in the field with immediate applicability must be taken into account, thus ensuring the compatibility of the curriculum with the European ones as well as better student mobility through European programs (SOCRATES/ERASMUS, Leonardo da Vinci, Tempus II, etc.).

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Cours	Correctness and completeness of knowledge. Logical coherence. Degree of assimilation of specialized language.	Active participation in courses.	40%
11.2 Laboratory	Students' ability to form and develop practical skills.	Practical method + computer-assisted assessment (at the end of the semester)	30%
	Active participation of students in laboratory work.	Oral + practical method (during the semester)	30%
11.3 Minimum performance standard			
Elaboration of a synthesis paper in the field of Technical Drawing, using pre-established criteria (weight 60%).			

Date of completion Signature of the course holder Signature of the laboratory instructor

20.09.2025 Senior lecturer.dr.eng.Andrei Komjaty Senior lecturer.dr.eng. Andrei Komjaty

Date of approval in the department Signature of the department director 26.09.2025
Assoc.Prof. dr.eng. Valentin Dan Muller

Date of approval in the faculty council Approval from the Dean
29.09.2026 Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	APPLIED INFORMATICS I
2.2 Course Lecturer:	Senior Lecturer dr.eng. Daniel DRAGU
2.3 Laboratory Instructor:	Senior Lecturer dr.eng. Daniel DRAGU
2.4 Year of Study:	1
2.5 Semester	1
2.6 Type of Assessment:	EXAMINATION
2.7 Course Status:	DF-compulsory

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

3.1 Hours per week:	3	of which 3.2 lecture	1	3.3 laboratory	2
3.4 Total hours in the study plan	42	of which 3.5 lecture	14	3.6 laboratory	28
Time allocation:					Hours
Study based on course materials, bibliography					8
Additional documentation in library, specialized databases, or field work					8
Preparation for seminars/labs, essays, portfolios					8
Tutoring					4
Examinations					3
Other activities...					2
3.7 Total hours of individual study					33
3.8 Total hours per semester					75
3.9 Number of credits					3

4. Preconditions (where applicable)

4.1. of curriculum	-
4.2. of competences	-

5. Conditions (where applicable)

5.1. of conducting the course	Classroom, equipped with laptop, smart board and appropriate local/online software
5.2. of conducting the laboratory	Properly equipped laboratory room: computers, network, Internet connection, specialized / online software

6. Specific Competencies Acquired

Professional Competencies	- C6 – Establish data processes - C9 – Develop Open Source Software
Transversal Competencies	- CT3 – Think Analytically

7. Learning Outcomes

Knowledge	- Understanding algorithms and data structures, programming paradigms and languages used in the field of automation - Identify open-source platforms and libraries for the development of technical software applications
Skills	- Use programming languages and ICT tools to transform raw data into useful information. - It uses open-source platforms and libraries for the development of technical software applications.
Responsibilities and autonomy	- Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. - Has the ability to manage technical projects responsibly and on time.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1. General objective of the discipline	Acquisition of theoretical knowledge and practical skills regarding the elaboration, representation and implementation of algorithms in the C programming language, with emphasis on procedural programming, memory management and efficient use of data structures, in order to solve problems specific to the field of Automation and Applied Informatics
8.2.Specific objectives	Students will be able to • Identify and use the fundamental concepts of algorithmics • Apply the principles of procedural programming • Write and compile programs in C language • Use pointers and manage dynamic memory allocation, as well as implement structures and unions for efficient data handling. • Build, test, and optimize source code • Use external sources and technical documentation to solve problems and deepen the knowledge acquired.

9. Course Content

9.1 Course	**Teaching methods**	**Observations**
1. Algorithms. Representation of algorithms. Logic diagrams	Exposition, description, explanations, examples, dialogue, interaction	2 hours
2. Algorithms. Pseudocode		2 hours
3. Notions of procedural programming		2 hours
4. C. Historical language. Syntax. Data types. Operators. Variables. Paintings. Functions.		4 hours
5. Pointers. Structures and unions. Dynamic memory allocation.		4 hours
	TOTAL	14 hours

Course Bibliography

1. Daniel Dragu, Applied Informatics 1 – course and laboratory notes, electronic version, 2025.
2. Frans Kaashoek, Operating System Engineering, Massachusetts Institute of Technology, MIT Open CourseWare, 2012.
3. Diarmuid O' Ríordáin, BE, MEngSc, MIEI, A Course in C Programming, Department of Applied Mathematics, University College Cork, 6th Revision, 2018.

9.2 Laboratory	**Teaching methods**	**Observations**

1. Representation of algorithms. Logical schemes. Pseudocode.	Exemplification on the computer. Functionality testing.	4 hours
2. Data types. Variables. Input/output functions		4 hours
3. Paintings. Functions		4 hours
4. Structures and unions		6 hours
5. Pointers		6 hours
6. Dynamic memory allocation		4 hours
	TOTAL	28 hours

Laboratory Bibliography:

1. Daniel Dragu, Applied Informatics 1 – course and laboratory notes, electronic version, 2025.
2. Diarmuid O' Ríordáin, BE, MEngSc, MIEI, A Course in C Programming, Department of Applied Mathematics, University College Cork, 6th Revision, 2018.

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The content of the discipline is in accordance with the discipline sheets of the discipline from other universities 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 with both representatives of the business environment and other specialized professors.

The teaching material was developed on the basis of representative textbooks of the field, recognized and appreciated by the academic community.

The examples presented in the course and laboratory applications aim to familiarize students with the customs of the field.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Knowledge and understanding of theoretical concepts, ability to apply	Written Paper / Grid Test	50%
11.2 Laboratory	Correct and effective application of concepts in problem solving Active participation	Applicative activities / practical works	40% + 10%
11.3 Minimum Performance Standard 1. The student knows the main concepts, defines them correctly and builds a simple application; 2. The specialized language is simple, but correctly used; 3. Minimum grade of 5 in the laboratory; 4. To solve a minimum of topics well – questions and applications.			

Date of completion Signature of the course holder Signature of the laboratory instructor

20.09.2025 Senior lecturer.dr.eng. Daniel Dragu Senior lecturer.dr.eng. Daniel Dragu

Date of approval in the department

26.09.2025

Signature of the department director

Assoc.Prof.dr.eng. Valentin Muller

Date of approval in the faculty council

29.09.2026

Approval from the Dean

Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty	FACULTY OF ENGINEERING
1.3 Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Cycle of studies	BACHELOR OF SCIENCE
1.6 Study Programme/Qualification	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	NUMERICAL METHODS
2.2 Course Lecturer:	Lecturer Dan-Stelian DEAC, Ph.D.
2.3 Laboratory Instructor:	Lecturer Dan-Stelian DEAC, Ph.D.
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	EXAMINATION
2.7 Course Status:	DF / Compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week:	4	of which 3.2 course	2	3.3 Laboratory	2
3.4 Total hours in the study plan	56	of which 3.5 courses	28	3.6 Laboratory	28
Time allocation:					hours
Study based on course materials, bibliography					20
Additional documentation in library, specialized databases, or field work					20
Preparation for seminars/labs, essays, portfolios					15
Tutoring					10
Examinations					4
Other activities...					
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 of curriculum	Fundamental knowledge acquired in the disciplines: Linear Algebra, Analysis Mathematics, Differential Equations,
4.2 of competences	Calculation and operating skills with simple programming notions

5. Conditions (where applicable)

5.1 of conducting the course	Classroom, laptop, video projector
5.2 of conducting the laboratory	Classroom, laptop, video projector

6 Specific Competencies Acquired

Professional Competencies	C1. Perform analytical mathematical calculations
Transversal Competencies:	CT3. Analytical thinking

7. Learning Outcomes

Knowledge	Graduate: Knows and identifies mathematical methods (linear algebra, numerical analysis) for modeling and solving engineering problems. It uses specific software tools (e.g. MATLAB) to automate analytical calculations and verify mathematical solutions in real contexts. Solve problems, think creatively and innovatively.
Skills	Graduate: Apply advanced mathematical methods (linear algebra, numerical analysis) for modeling and solving engineering problems. It uses specific software tools (MATLAB) to automate analytical calculations and verify mathematical solutions in real contexts. Think analytically and creatively.
Responsibilities and autonomy	Graduate: Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. Can work independently or in a team to implement and test automation solutions in a real professional environment. Approach the problem critically.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1 General objective of the discipline	Presentation, understanding and deepening of the main numerical methods and numerical algorithms, regarding: linear and nonlinear algebra, approximation of functions, differential and integral calculus, numerical solution of differential equations and partial derivatives.
8.2 Specific objectives	To create the skills to identify the typical situations of each method studied, to understand and correctly apply the principles of structured programming in the creation of their own libraries of programs. The possibility to compare different algorithms for the same problem and to be able to choose the best one.

9. Course Content

9.1 Course	Teaching methods	Observations
1. The MATLAB programming environment – introduction.	Participatory lecture, exposition, problematization, demonstration, modeling.	2 hours
2. Matlab files. Scripts.	Participatory lecture, exposition, problematization, demonstration, modeling.	4 hours
3 Variables, vectors, matrices. Operations. Control instructions.	Participatory lecture, exposition, problematization, demonstration, modeling.	4 hours
4. 2d graphical representations in Matlab.	Participatory lecture, exposition, problematization, demonstration, modeling.	4 hours
5. 3d Graphical Representations in Matlab	Participatory lecture, exposition, problematization, demonstration, modeling.	4 hours
6. Numerical calculations with polynomials.	Participatory lecture, exposition, problematization, demonstration, modeling.	4 hours
7. Solving linear and nonlinear equations.	Participatory lecture, exposition, problematization, demonstration, modeling.	4 hours
8. Solving systems of equations.	Participatory lecture, exposition, problematization, demonstration, modeling.	2 hours
	Total	28 hours

Course bibliography	[1]. Kilyeni Şt., Numerical Methods. Algorithms, Computer Programs, Applications in Energetics, Ed. 4th, University Horizons, Timişoara, 2011. [2]. D. Deac, Numerical methods – course and laboratory notes, SUMS platform – UAV, 2025. [3]. M. Ghinea, M.V. Firețeanu, Matlab. Numerical calculation. Graphics. Applications, Teora, 2008. [4]. B. D. Hahn, D. T. Valentine, Essential MATLAB® for Engineers and Scientists, Esevier, Third edition 2007. [5]. Hadar A., Marin C., Petre C., Voicu A., Numerical Methods in Engineering, Politehnica Press Publishing House, Bucharest, 2004. [6]. Soare C., Iliescu S.St., Făgărăşan I., Tudor V., Niculescu O.F., Computer-aided design in Matlab and Simulink. Modeling and Process Simulation, Agir Publishing House, Bucharest, 2006.

9.2 Laboratory	Teaching methods	Observations
1. The MATLAB programming environment – introduction.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours

2. Matlab files. Scripts.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
3 Variables, vectors, matrices. Operations. Control instructions.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
4. 2d graphical representations in Matlab.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
5. 3d Graphical Representations in Matlab	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
6. Numerical calculations with polynomials.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
7. Solving linear and nonlinear equations.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
8. Solving systems of equations.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours
	Total	28 hours
Laboratory bibliography	[1]. D. Deac, Numerical methods – course and laboratory notes, SUMS platform – UAV, 2025. [2]. S.R. Otto, J.P. Denier, An Introduction to Programming and Numerical Methods in MATLAB, Springer-Verlag London, 2005. [3]. Hadar A., Marin C., Petre C., Voicu A., Numerical Methods in Engineering, Politehnica Press Publishing House, Bucharest, 2004. [4]. http://www.mathworks.com/. [5]. https://www.tutorialspoint.com/.	

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

Through its contents, the discipline has a pronounced pragmatic character, contributing to the formation of basic computer knowledge for a future engineer.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Solving the topics Logical coherence; Degree of assimilation of specialized language.	Written Assessment	60%
11.2 Laboratory	Verification of knowledge acquired in the laboratory	Practical assessment	40%

11.3 Minimum Performance Standard
Knowledge of the fundamental elements of theory and solving a simple application.

Date of completion	Signature of the course holder	Signature of the laboratory instructor
20.09.2025	Senior lecturer.dr. Dan Stelian Deac	Senior lecturer.dr. Dan Stelian Deac

Date of approval in the department	Signature of the department director
26.09.2025	Assoc.Prof. dr.eng. Valentin Dan Muller

Date of approval in the faculty council	Approval from the Dean
29.09.2026	Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

12. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

13. Course Information

2.1 Course Title:	COMPUTATIONAL LOGIC
2.2 Course Lecturer:	Senior Lecturer dr.eng. Daniel DRAGU
2.3 Laboratory Instructor:	Assistant Professor Bogdana Tania GAVRILĂ
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DS-compulsory

14. Total estimated time

3.1 Hours per week:	2	of which 3.2 lecture	1	3.3 Laboratory	1
3.4 Total hours in the study plan	28	of which 3.5 lecture	14	3.6 Laboratory	14

Time allocation:	Hours
Study based on course materials, bibliography	10
Additional documentation in library, specialized databases, or field work	12
Preparation for seminars/labs, essays, portfolios	15
Tutoring	5
Examinations	3
Other activities...	2
3.7 Total hours of individual study	47
3.8 Total hours per semester	75
3.9 Number of credits	3

15. Preconditions (where applicable)

4.1 of curriculum	-
4.2 of competences	-

16. Conditions (where applicable)

5.1 of conducting the course	Classroom equipped with laptop, video projector/smart board and appropriate local/online software
5.2 of conducting the laboratory	Properly equipped laboratory room: computers, network, Internet connection, specialized / online software

17. Specific Competencies Acquired

Professional competencies	- C4 – Analyze production processes with a view to improving - C5 – Design control systems - C9 – Develop Open Source Software
Transversal competencies	- CT3 – Think Analytically

7. Learning Outcomes

Knowledge	- Define performance indicators. - Understand the basic and advanced principles of automatic control (feedback, stability, tuning) and their application in the design of automated systems. - Identify open-source platforms and libraries for the development of technical software applications
Skills	- Propose and validate optimization solutions to reduce costs and increase efficiency. - Design automatic control structures for industrial processes using mathematical models and performance criteria. - It uses open-source platforms and libraries for the development of technical software applications.
Responsibilities and autonomy	- Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. - Has the ability to manage technical projects responsibly and on time. - It has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control).

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	Formation of the skills necessary for the use of formal language and fundamental reasoning of logic and the development of the ability to correctly apply the accumulated knowledge in order to develop and analyze problem-solving algorithms.
8.2 Specific objectives	The use of formalisms specific to logic; Modeling reasoning using sentence logic and predicate logic; Understanding how simple logic circuits work; Data analysis, interpretation and processing.

9. Contents

9.1 Course	**Teaching methods**	**Observations**
1. Introductory - Logic, Computational Logic, Value Domain	Exposition, description, explanations, examples,	2 hours
2. Sentence logic - syntax and semantics - syntax: connectives, precedence of connectives, formulas;		4 hours

- semantics: interpretation of a formula, model, consistent formula (achievable), inconsistent formula (contradictory), tautology, contradiction, contingency, satisfiability, equivalence, logical consequence.	dialogue, interaction	
3. The truth table of a formula. - logical equivalences (laws of logic): DeMorgan's laws, identity, domination, negation, double negation, absorption, commutativity, associativity, distributivity, idempotence. - Normal terms and forms: • normal conjunctive form (FNC); • disjunctive normal form (FND); • the algorithm of bringing a formula to the FNC and FND.		4 hours
4. Elements of argumentation theory: - reasoning, argument, premise, conclusion - Rules of inference: modus ponenes, modus tollens, hypothetical syllogism, disjunctive syllogism, introduction of conjunction, introduction of disjunction, exclusion of conjunction, exclusion of disjunction		2 hours
5. The logic of first-order predicates - syntax elements: connectives, quantifiers, terms, atoms, formulas, literals, clauses, value range. - formal (axiomatic) system associated with predicate logic. - The semantics of predicate logic: interpretation, model, valid formula, consistent formula, contradictory formula, logical consequence relation.		2 hours
	TOTAL	14 hours

Course bibliography:

1. D. Dragu, Computational Logic – Course and Laboratory Notes, electronic version, 2025.
2. Mi Lu, Arithmetic and Logic in Computer Systems, John Wiley & Sons, 2004.
3. J.-J. Ch. Meyer, W. van der Hoek, Epistemic Logic for AI and Computer Science, Cambridge University Press, 2004.

9.2 Laboratory	**Teaching methods**	**Observations**
1-7. Practical aspects based on the topics discussed in the course, applications with combinational logic circuits	Exemplification on the computer. Feature testing	14 hours
	TOTAL	14 hours

Laboratory bibliography:

1. D. Dragu, Computational Logic – Lecture and Laboratory Notes, electronic version, 2025.
2. Tertulien Ndjountche, Digital Electronics 1: Combinational Logic Circuits, Volume 1, ISTE Ltd 2016.

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The content of the course is in accordance with the course sheets from other universities 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 with representatives of the business environment and similar study programs from other universities were accessed and analyzed.

The teaching material was developed on the basis of representative textbooks of the field, recognized and appreciated by the academic community.

Some of the examples presented in the laboratory applications course originate from communications, lectures, project topics and other similar materials.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Knowledge and understanding of theoretical concepts, ability to apply	Written Paper / Grid Test	50%
11.2 Laboratory	• Correct and effective application of concepts in problem solving • Active participation	Applicative activities / practical works	40% + 10%
11.3 Minimum Performance Standard 1. The student knows the main concepts, defines them correctly and builds a simple application; 2. The specialized language is simple, but correctly used; 3. Minimum grade of 5 in the laboratory; 4. To solve a minimum of topics well – questions and applications.			

Date of completion | Signature of the course holder | Signature of the laboratory instructor

20.09.2025 | Senior lecturer dr.eng. Daniel Dragu | Assist.univ.drd. Bogdana Tania Gavrilă

Date of approval in the department | Signature of the department director

26.09.2025 | Assoc. Prof. dr. eng. Valentin Dan Muller

Date of approval in the faculty council | Approval from the Dean

29.09.2026 | Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

18. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

19. Discipline Data

2.1 Course Title:	CHEMISTRY
2.2 Course Lecturer:	Assoc. Prof.dr.eng. Magdalena Simona Fogorosi
2.3 Laboratory Instructor:	Assoc. Prof.dr.eng. Magdalena Simona Fogorosi
2.4 Year of Study:	1
2.5 Semester	1
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DF-compulsory

20. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week:	4	of which 3.2 lecture	2	3.3 Laboratory	1
20.4. 3.4 Total hours in the study plan	42	of which 3.5 lecture	28	3.6 Laboratory	14

Time allocation:	Hours
Study based on course materials, bibliography	30
Additional documentation in library, specialized databases, or field work	12
Preparation for seminars/labs, essays, portfolios	7
Tutoring	4
Examinations	3
Other activities...	2
3.7 Total hours of individual study	58
3.8 Total hours per semester	100
3.9 Number of credits	4

21. Preconditions (where applicable)

4.1 of curriculum	Inorganic and organic chemistry courses in secondary school and high school.
4.2 of competences	Cognitive skills: having basic notions in the fields of inorganic and organic chemistry. Action skills: information and documentation, activity argumentation and use of information technologies

22. Conditions (where applicable)

5.1 of conducting the course	The course room equipped with a video projector
5.2 of conducting the laboratory	Chemistry laboratory equipped with substances, laboratory utensils, glassware specific to a chemistry laboratory

23. Specific Competencies Acquired

Professional Competencies	- C3. Include new products in the production process.
Transversal Competencies:	- CT1. Work in teams - Work confidently within a group, each doing his or her part in the service of the whole.

7. Learning Outcomes

Knowledge	He has knowledge of the operation of some methods, algorithms, equipment. Identify how certain products can be included in production
Skills	Document and implement procedures for introducing a new product into the manufacturing flow. It ensures the training of operators and the adaptation of equipment to the requirements of the new product.
Responsibilities and autonomy	Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. Can work independently or in a team to implement and test automation solutions in a real professional environment. Has the ability to manage technical projects responsibly and on time. It has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control). Manifestation of ethical behavior and a professional attitude in the engineering activity.

8. Objectives of the discipline (resulting from the grid of specific skills accumulated)

8.1. General objective of the discipline	The course familiarizes students in the field of Systems Engineering with the basics of fundamental aspects of chemistry. In the first part, the fundamental notions of chemistry, aspects related to chemical reactions, chemical bonds, the periodic system of elements are treated. Next, the general properties of elements, the characteristic properties of metals, the electrical properties of substances as well as notions related to disperse systems, corrosion of metals and lubricants are further studied. The study of the discipline offers the possibility of knowing chemical substances and their properties with applicability in construction, finishing, processing of materials by chemical methods, anti-corrosion protection, lubrication and cooling, protection by inert gases, thermochemical treatments, automation processes and in the manufacture of component parts of various electronic components. The role of chemistry in various fields such as defectoscopy, thermochemical treatments, metallurgy as well as in the development of cutting-edge technologies and ecological industrial processes is highlighted

	The laboratory works aim to get students used to the analysis of chemical substances, with the use of equipment and the use of theoretical notions in chemical practice.
8.2. Specific objective of the discipline	- Performing calculations, demonstrations and applications, for solving tasks specific to industrial engineering based on knowledge in chemistry. - Association of knowledge, principles and methods specific to the technical sciences of the industrial field for the identification and analysis of the characteristics of specific products.

9. Course Contents

9.1 Course	**Teaching methods**	**Observations**
Fundamentals. Fundamental Laws of Chemistry	Lecture, descriptive explanations, argumentative support, problematization, conversation	2 hours
Chemical bonds. Chemical reactions		4 hours
Atom. Structure of the electronic shell of the elements		2 hours
Mendeleev's Periodic Classification of the Elements		2 hours
General Element Properties		2 hours
Characteristic properties of metals		4 hours
Electrical properties of substances. Semiconductors		2 hours
Electrotechnical and electronic materials. Insulating materials		2 hours
Dispersed systems		4 hours
Metal corrosion and corrosion protection		2 hours
Lubricant chemistry		2 hours
		Total: 28 hours
9.2 Laboratory	**Teaching methods**	**Observations**
Notions of the technique of occupational safety in the chemistry laboratory. Presentation of dishes and laboratory utensils.	Observation and Observation.	2 hours
Basic operations (weighing, volume measurement, filtering)	Experiment, demonstration, observation, modeling, problematization,	2 hours
Methods of purification of chemical compounds		2 hours
Solutions. Concentration of solutions. Preparation of solutions		2 hours
Acids and bases. pH of the solutions. Determination of the pH of solutions.		2 hours
Electrolytic cells. Water electrolysis.		2 hours
Knowledge verification. Recoveries		2 hours
		Total: 14 hours

Bibliography

1. M. S. Fogorasi, Chemistry Course support in updated electronic format, 2025.
2. M. S. Fogorasi, Chemistry – laboratory papers in electronic format, 2025.
3. C.D. Nenitescu, General Chemistry, EDP Bucharest, 1987.
4. E. Beral, M. Zapan, Inorganic Chemistry, Technical Publishing House, Bucharest, 1977.
5. D. Negoiu, Treatise on Inorganic Chemistry, Technical Publishing House, Bucharest, 1972.
6. C. Ioan, Gh. Burlacu, M. Bezdadea, General Chemistry, p. I-a si a II-a, Rotaprint, Iasi, 1978.
7. S. Ifrim, General Chemistry, EDP, Bucharest, 2003.
8. I.B. Pancan, I. Tolan, A. M. Bodescu, Inorganic Chemistry, "Aurel Vlaicu" University Publishing House of Arad. 2005.

9. A. Mihaly Cozmuţa, L. Mihaly Cozmuţa, General Chemistry Course, Risoprint Cluj-Napoca, 2007.
10. W.T. Lippincot, A.B. Garrett, F. H. Verhoek, Chemistry, Scientific Publishing House, Bucharest, 1994.
11. I.M. Popa, N. Aelenei, GH, Ionescu, Physical Chemistry of Interphase Phenomena and Polydispersed Systems, Cronica Publishing House, Iasi, 1996.
12. L. Ciohodaru, General Chemistry for Engineers, Printech Publishing House, 2007.
13. J. S. Gaffney, N. A. Marley, General Chemistry for Engineers, Elsevier Inc., 2018.
14. A. Trofin, General Chemistry. Ed. Studis, Iaşi, 2018.
15. R. Chang, General Chemistry: The Essential Concepts, 7th Edition, Mcgraw Hill Companies Inc, 2014.
16. E. Ungureanu, A. Trofin, The Foundations of Physical and Colloidal Chemistry, Ed. Pim, Iaşi, 2015.
17. L.V Costea, A. Magda, Theoretical notions and experiences of general chemistry, Politehnica Publishing House, Timișoara, 2014.
18. L. JÄNTSCHI, General Chemistry Course, AcademicDirect, http://ph.academicdirect.org/General_Chemistry_Course_v5.pdf, 2013.
19. http://www.wou.edu/chemistry/courses/online-chemistry-textbooks.
20. https://chem.libretexts.org/.

10. Corroboration of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

The graduate must have knowledge and skills regarding the structure and properties of the substances and materials used in the field of study, analyzing them and the chemical treatments applied from the point of view of the optimal properties of use conferred to the articles according to the destination, of the management of technological processes with minimal technological costs in parallel with ensuring the protection of the environment, of the personnel involved in the production and implicitly of the beneficiaries.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Precent of final grade
11.1 Course	Identify and explain basic concepts, principles and methods in the field of chemistry. Knowledge of properties, their logical association	Written exam Active participation in courses	50%
11.2 Laboratory	1. Training of independent work skills in the laboratory and correct interpretation of the phenomena studied and observed.	Checking Practical Skills Active participation	50%
	2. Performing/retrieving laboratory work		

11.3 Minimum Performance Standard			
Correct solving of calculations and chemistry problems of medium complexity, specific to engineering sciences. Correct identification and analysis of the characteristics of a specific product. Complete completion of the laboratory work and presentation of the portfolio of practical works within the laboratory evaluation.			

Date of completion	Signature of the course holder	Signature of the laboratory instructor
20.09.2026	Assoc.prof.dr.eng. Magdalena Simona Fogorosi	Assoc.prof.dr.eng. Magdalena Simona

Date of approval in the department	Signature of the department director
26.09.2026	Assoc. Prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council	Approval from the Dean
29.09.2026	Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
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1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	COMPUTER PROGRAMMING AND PROGRAMMING LANGUAGES
2.2 Course Lecturer:	Senior Lecturer dr. Andrei-Marius GABOR
2.3 Laboratory Instructor:	Senior Lecturer dr. Andrei-Marius GABOR
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	EXAMINATION
2.7 Course Status:	DF-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week:	4	of which 3.2 lecture	2	3.3 Laboratory	2
3.4 Total hours in the study plan	56	of which 3.5 lecture	28	3.6 Laboratory	28

Time allocation:	hours
Study based on course materials, bibliography	20
Additional documentation in library, specialized databases, or field work	10
Preparation for seminars/labs, essays, portfolios	10
Tutoring	0
Examinations	4
Other activities...	0
3.7 Total hours of individual study	44
3.8 Total hours per semester	100
3.9 Number of credits	4

4. Preconditions (where applicable)

4.1 of curriculum	Basics of computer science – understanding of computational concepts, data, algorithms, as well as familiarity with the basic structure of a computing system; Basic programming – the ability to write, compile and execute programs in languages such as C, C++ or Python, necessary for understanding system calls and processes; Data structures – knowledge on the efficient organization of data (lists, stacks, queues, trees), useful in understanding memory and file system management; Computer architecture – notions about processor, memory, buses, input/output devices, essential for understanding the interaction between the operating system and hardware;

4.2 of competences	Ability and ability to solve problems using the java programming language Computer skills at a functional level (file and folder management, application installation, system resource use); Autonomous learning capability, including online documentation, use of command manuals (man) and technical forums.

5. Conditions (where applicable)

5.1 of conducting the course	The course is held face-to-face, with digital support (presentations, PDF files, code examples) made available to students through the educational platform used by the institution (SUMS);
5.2 of conducting the laboratory	Laboratory room, properly equipped: computers, network, Internet connection, software.

6. Specific Competencies Acquired

Professional Competencies	C6. Establish data processes C9. Develop open source software
Transversal Competencies:	CT1. Work in teams - Work confidently within a group, each doing his or her part in the service of the whole.

7. Learning Outcomes

Knowledge	Know algorithms for data processing and analysis. Knows programming languages (e.g. C++, C#) Understanding algorithms and data structures, programming paradigms and languages used in the field of automation Know the principles and stages of teamwork
Skills	Create algorithms for data processing and analysis in applications industrial and engineering. Use programming languages (e.g. Python, R) and ICT tools to transform raw data into useful information. Actively participates in team activities, contributing to the achievement of common goals. Apply licensing and collaboration principles in open source software projects, adhering to open-source community standards
Responsibilities and autonomy	Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. Can work independently or in a team to implement and test automation solutions in a real professional environment. Has the ability to manage technical projects responsibly and on time. It has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control). Manifestation of ethical behavior and a professional attitude in the engineering activity. They take on their own tasks and respect the deadlines set in the team.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1 General objective of the discipline	- Development of generic theoretical and practical skills in engineering sciences; - Ensuring the engineering knowledge fund specific to the field of systems engineering;

	- Developing skills and abilities for research, development, design and implementation of specific processes, products and services; - Developing the knowledge necessary for technical-economic analysis; - Developing strategic partnerships with the business environment to facilitate access and integration of graduates on the local, national and European labor market.
8.2 Specific objectives	- Fundamental engineering training; - Ensuring knowledge of computer graphics and materials making skills computer-aided graphs; - Providing general technical knowledge in the field of systems engineering; - Ability to conceive, promote and carry out group projects; - Acquiring the skills to integrate technical knowledge specific to all categories of processes and products; - Acquiring the ability to manage the quality of products at the design stage, to control and check the final quality of products and processes; - Cultivation of analytical, synthesis and complex problem-solving skills, specific to systems engineering. - Development of fundamental skills in modeling, analysis and simulation of systems using advanced mathematical methods and specialized computer tools. - Training of skills in designing, implementing and validating automatic control systems, with applicability in various industrial and technological fields. - Acquiring advanced knowledge in the field of programming and dedicated software development automatic and computer systems. - Development of the integration capacity of hardware and software components (sensors, actuators, PLCs, controllers, communication systems) for the implementation of automated solutions. - Acquiring the principles and methods of designing and optimizing computer networks and distributed computing systems, with applications in the field of automation and processes Industrial. - Promoting the use of emerging technologies (artificial intelligence, machine learning, Internet of Things) in the design and optimization of automated systems. - Training of work skills in multidisciplinary teams and project management in accordance with the requirements of the current professional environment. - Developing ethical and responsible professional behaviour, geared towards learning professional adaptation and innovation.

9. Contents

9.1 Course	Teaching methods	Observations
1. Introductory Elements • Java 2 Standard Edition (J2SE) • Java 2 Enterprise Edition (J2EE) • Java 2 Micro Edition (J2ME) • Java Language Basics: Character Set, Keywords, Reserved Words, Identifiers, Literals, Separators, Comments, Operators, Variables, Expressions, Instructions, Vectors, Strings, Arguments	Presentation with the video projector, discussions	4 hours
2. Classes and Objects in Java • Objects and Classes. Relations between classes. Object Relationships • Object Creation • Object Destruction • Subclasses and Inheritance • Shadow Variables • Method Override • Data Hiding and Encapsulation • Abstract Classes. Interfaces	Presentation with the video projector, discussions	4 hours
3. Exceptions and Their Handling • Handling Exceptions • Throwing Exceptions • Advantages of Handling Exceptions • Hierarchy of Classes Describing Exceptions • Special Exceptions	Presentation with the video projector, discussions	3 hours
4. Applets • Basic concepts • Restrictions • Advantages of applets • Structure of an applet • Running applets • Using the appletviewer • Testing applets • AWT graphics used in an applet • Handling events generated by AWT components • Java Applets: Tips & Tricks	Presentation with the video projector, discussions	3 hours
5. Java Graphical Interfaces • Graphical User Interfaces • User Interface Design Steps • Java Foundation Classes (JFC) • MVC Model View Controller Swing Library Components and Packages • Base Containers • Intermediate Containers • Simple Atomic Components • Complex Atomic Components	Presentation with the video projector, discussions	3 hours
6. Threads in Java • Thread States • Working with Threads in Java • Extending the Thread Class • Implementing the Runnable Interface • Synchronizing Threads	Presentation with the video projector, discussions	3 hours
7. Java Database Connectivity- JDBC • JDBC Drivers • Accessing a Database Using JDBC • Registering the JDBC Driver • Establishing the Database Connection • Executing a SQL Statement • Processing Results • Closing the Database Connection • Usage Example	Presentation with the video projector, discussions	3 hours
8. Java Servlets • Introduction • Advantages of Servlets • How to work with servlets • Structure of a servlet • Life cycle of a servlet • Rewriting the doGet and doPost methods • Implementation example	Presentation with the video projector, discussions	3 hours
9. Java 2 Micro Edition (J2ME) • Configuration • Profiles • CLDC Configuration • CLDC Virtual Machine Specifications • CLDC Class Library • MIDP Profile • Java MIDP Applications • Java Archive File – JAR (Java ARchive) • Application Descriptor File – Java Application Descriptor (JAD) • MIDlet Development	Presentation with the video projector, discussions	2 hours

	Total	28 hours
Course bibliography	1. Hughes, J. F., van Dam, A., McGuire, M., Sklar, D. F., Foley, J. D., Feiner, S. K., & Akeley, K. (2013). Computer Graphics: Principles and Practice (3rd ed.). Addison-Wesley. oreilly.com+1. 2. Marschner, S., & Shirley, P. (2021). Fundamentals of Computer Graphics (5th ed.). CRC Press. https://doi.org/10.1201/9781003050339 Taylor & Francis+1. 3. Akenine-Möller, T., Haines, E., Hoffman, N., Pesce, A., Iwanicki, M., & Himawan, S. (2018). Real-Time Rendering (4th ed.). CRC Press. Routledge+1. 4. Oracle. (2024, Oct.). The Java™ Tutorials: 2D Graphics. https://docs.oracle.com/javase/tutorial/2d. 5. Oracles. (n.d.). Trail: Creating a GUI with Swing. https://docs.oracle.com/javase/tutorial/uiswing/ 6. Oracle. (n.d.). Java 2D API – Getting Started / Advanced Topics. https://docs.oracle.com/javase/tutorial/2d/ 7. Oracle. (n.d.). JavaFX Documentation (overview & tutorials). https://www.oracle.com/java/technologies/javase/javafx-docs.html 8. Horstmann, C. S. (2022). Core Java, Volume I: Fundamentals (12th ed.). Pearson. 9. Hellwig, D. (2023). Modern JavaFX for Enterprise Developers. Afterwards. 10. Eck, D. J. (2023). Introduction to Programming Using Java (9th ed.). 11. Computer Programming and Programming Languages Course, SUMS – UAV – Gabor Andrei, 2025.	

9.2 Laboratory	**Teaching methods**	**Observations**
1. Introducing and Operating with Sun Microsystems SDKs, Java Language Basics	Explanations, conversation and testing	4 hours
2. Java Language Instructions	Explanations, conversation and testing	4 hours
3. Classes and objects in Java. Creating objects. Builders. Class variables. Static methods. Legacy	Explanations, conversation and testing	4 hours
4. Shadow variable. Overwriting methods. Hiding and encapsulating data. Abstract Classes and Methods in Java	Explanations, conversation and testing	2 hours
5. Exceptions in Java. Applications	Explanations, conversation and testing	2 hours
6. Components of the graphical interface. Events generated by AWT components	Explanations, conversation and testing	2 hours
7. Java Swing. JFrame. JApplet. JPanel. Borders. Tabbed Breads. Scrolling Panes.	Explanations, conversation and testing	2 hours

Split Breads. JLabel. JButton. JToggleButton. JCheckBox.		
8. Threads in Java	Explanations, conversation and testing	2 hours
9. JDBC. Access to databases	Explanations, conversation and testing	4 hours
10. Java Servelets. Applications	Explanations, conversation and testing	2 hours
	Total	28 hours
Laboratory bibliography	1. Hughes, J. F., van Dam, A., McGuire, M., Sklar, D. F., Foley, J. D., Feiner, S. K., & Akeley, K. (2013). Computer Graphics: Principles and Practice (3rd ed.). Addison-Wesley. oreilly.com+1. 2. Marschner, S., & Shirley, P. (2021). Fundamentals of Computer Graphics (5th ed.). CRC Press. https://doi.org/10.1201/9781003050339 Taylor & Francis+1. 3. Akenine-Möller, T., Haines, E., Hoffman, N., Pesce, A., Iwanicki, M., & Himawan, S. (2018). Real-Time Rendering (4th ed.). CRC Press. Routledge+1. 4. Oracle. (2024, Oct.). The Java™ Tutorials: 2D Graphics. https://docs.oracle.com/javase/tutorial/2d. 5. Oracles. (n.d.). Trail: Creating a GUI with Swing. https://docs.oracle.com/javase/tutorial/uiswing/ 6. Oracle. (n.d.). Java 2D API – Getting Started / Advanced Topics. https://docs.oracle.com/javase/tutorial/2d/ 7. Oracle. (n.d.). JavaFX Documentation (overview & tutorials). https://www.oracle.com/java/technologies/javase/javafx-docs.html 8. Horstmann, C. S. (2022). Core Java, Volume I: Fundamentals (12th ed.). Pearson. 9. Hellwig, D. (2023). Modern JavaFX for Enterprise Developers. Afterwards. 10. Eck, D. J. (2023). Introduction to Programming Using Java (9th ed.). 11. Computer Programming and Programming Languages Laboratory, SUMS – UAV- Gabor Andrei, 2025.	

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

The content of the discipline is in accordance with the content of similar disciplines from 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 teachers of mathematics and computer science from the Arad pre-university education.

11. Rating

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	• correctness and completeness Knowledge • logical coherence • the degree of assimilation of the language of speciality	The evaluation of the course will be in the form of a written exam in examination session.	50%
11.2 Laboratory	• the ability to operate with the assimilated knowledge; • Ability to apply in practice	The evaluation of the seminar will be elaborated in the form of 3 items: 1. Active participation in the laboratory brings points to the student (40% of the seminar grade) 2. Topics proposed to students (40% of the seminar grade) 3. projects (20% of the grade seminar)	50%

11.3 Minimum Performance Standard

Minimum standard (knowledge and skills required for grade 5) Knowledge of the fundamental elements of theory, solving a simple application. The final grade is calculated as a weighted average of the grades awarded for the components specified in 11.1 and 11.2. The exam is considered passed if each of the grades 11.1 and 11.2 is at least 5. At each of the exam sessions (including those of arrears and augmentations) the grade is calculated according to the same rule. In the arrears/increases session, only the tests in which a passing grade has not been obtained (minimum 5) can be given, unless the student wants to take the tests already passed. Note: Students can participate in the consultation hours (2 hours/week according to the schedule established at the beginning of the semester) during which the course and/or seminar/laboratory holder answers the students' questions and provides additional explanations related to the course content, laboratory applications and homework.

Date of completion	Signature of the course holder	Signature of the laboratory instructor
20.09.2026	Senior Lect.dr. Andrei-Marius Gabor	Senior Lect.dr. Andrei-Marius Gabor

Date of approval in the department	Signature of the department director
26.09.2025	Assoc.Prof. dr.eng. Valentin Dan Muller

Date of approval in the faculty council	Approval from the Dean
29.09.2026	Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	PHYSICAL EDUCATION AND SPORT 1
2.2 Course Lecturer:	
2.3 Seminar Instructor:	Assistant drd. Vlad Adrian GEANTĂ
2.4 Year of Study:	1
2.5 Semester	1
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DC-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week:	1	of which 3.2 lecture	0	3.3 Seminar	1
3.4 Total hours in the study plan	14	of which 3.5 lecture	0	3.6 Seminar	1

Time allocation:	Hours
Study based on course materials, bibliography	8
Additional documentation in library, specialized databases, or field work	
Preparation for seminars/labs, essays, portfolios	
Tutoring	
Examinations	2
Other activities...	1
3.7 Total hours of individual study	11
3.8 Total hours per semester	25
3.9 Number of credits	1

4. Preconditions (where applicable)

4.1 of curriculum	
4.2 of competences	

5. Conditions (where applicable)

5.1 of conducting the course	
5.2 of conducting the seminar	Gym, Sports Field

6. Specific Competencies Acquired

Professional skills	
Transversal competences	- CT1. Work in teams - Work confidently within a group, each doing his or her part in serving the whole. - CT2. Comply with regulations - Comply with the rules, regulations and guidelines related to a particular field or sector and apply them in their daily work.

7. Learning Outcomes

Knowledge	Know the principles and stages of teamwork. Know ways to communicate and collaborate effectively. Know the principles of professional ethics and deontology. He is familiar with the applicable procedures and quality standards.
Skills	Actively participates in team activities, contributing to the achievement of common goals. Demonstrates the ability to negotiate and resolve conflicts constructively. Correctly apply activity-specific regulations, procedures, and instructions. Propose solutions to improve compliance with rules and procedures.
Responsibilities and autonomy	They take on their own tasks and respect the deadlines set in the team. Contribute to a positive and productive team climate. Respects the principles of professional ethics in all activities carried out It contributes to the promotion of an organizational culture based on compliance and integrity. Manifestation of ethical behavior and a professional attitude in the engineering activity.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	Development of generic theoretical and practical skills in engineering sciences. Providing the engineering knowledge fund specific to the field of systems engineering. Development of competences and abilities for the research, development, design and implementation of specific processes, products and services. Development of the knowledge necessary for technical-economic analyses. Development of strategic partnerships with the business environment to facilitate the access and insertion of graduates on the local, national and European labor market.
8.2 Specific objectives	Fundamental engineering training. Ensure knowledge of computer graphics and computer-aided graphic design skills. Provide general technical knowledge in the field of systems engineering. Ability to conceive, promote and carry out group projects. Acquire the skills to integrate technical knowledge specific to all categories of processes and products. Acquiring the ability to direct the quality of products from the design stage, to control and verify the final quality of products and processes.

9. Contents

9.1 Course	**Teaching methods**	**Observations**

Course bibliography		

9.2 Seminar	Teaching methods	Observations
Athletics: elements from the school of running and jumping.	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	3 hours
Fitness/Jogging	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
Elements of gymnastics: front exercises and formations	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
Table tennis	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
Sports games: basketball, volleyball, football	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	3 hours
Combat/Self-defense	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
	Total	14 hours
Seminar bibliography	1. Bushman, B., 2011, Complete guide to fitness and health, Human Kinetics, Champaign, IL; 2. CORBIN, B. C., RUTH, L., 2007, Fitness for life, Human Kinetics, Champaign, IL. 3. DRAGNEA, A., BOTA, A., 1999, Theory of Motor Activities, Didactic and Pedagogical Publishing House, Bucharest. 4. IONESCU, A., MAZILU, V., 1971, Physical Exercise in the Service of Health, Stadion Publishing House, Bucharest. 5. SCARLAT, E., SCARLAT, M. B., 2011, Treatise on Physical Education, Didactic and Pedagogical Publishing House, Bucharest. 6. ULMEANU, I., 1966, Notions of Physiology with Applications to Physical Exercises, UCFS Publishing House, Bucharest. 7. Vlad bag – electronic seminar on the SUMS platform, 2025.	

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

Through its contents, the discipline has a pronounced pragmatic character, contributing to the training of specialists in the field of specialization through the following: harmonious development of the body;

optimizing health; optimizing health; preventing the onset of global and segmental physical deficiencies, forming and maintaining correct body attitudes; stimulating students' interest in the systematic and independent practice of physical exercise individually and collectively on a daily or weekly basis; creating the habit of observing the rules of sports hygiene and accident prevention; developing the capacity for self-defense and self-improvement.

11. Rating

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course			
11.2 Seminar	Active participation in classes Disposition to physical and intellectual effort Suitable equipment Appropriate attitude for teamwork	Execution of exercises as number and correctness; Continuous evaluation during the activity; Tests during the semester and their grading; Reports for those exempted	70% 10% 10% 10%
11.3 Minimum Performance Standard Minimum 5 attendances at Physical Education and Sports classes Control Tests: Speed Running 20m Squats: 20 reps Long jump from the spot without momentum			

Date of completion
20.09.2025

Signature of the course holder

Signature of the seminar instructor
Assist.drd. Vlad Andrei Geantă

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty	ENGINEERING
1.3 Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORT
1.4 Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle	BACHELOR OF SCIENCE
1.6 Study Programme/Qualification	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	PHYSICAL EDUCATION AND SPORT 1
2.2 Course Lecturer:	
2.3 Seminar Instructor:	Assistant university phd. Vlad Adrian GEANTĂ
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DC-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week:	1	of which 3.2 lecture	0	3.3 Seminar	1
3.4 Total hours in the study plan	14	of which 3.5 lecture	0	3.6 Seminar	1

Time allocation:	Hours
Study based on course materials, bibliography	8
Additional documentation in library, specialized databases, or field work	
Preparation for seminars/labs, essays, portfolios	
Tutoring	
Examinations	2
Other activities...	1
3.7 Total hours of individual study	11
3.8 Total hours per semester	25
3.9 Number of credits	1

4. Preconditions (where applicable)

4.1 of curriculum	
4.2 of competences	

5. Conditions (where applicable)

5.1 of conducting the course	
5.2 of conducting the seminar	Gym, Sports Field

6. Specific Competencies Acquired

Professional Competencies	
Transversal Competencies:	CT1. Work in teams - Work confidently within a group, each doing their part in serving the whole. CT2. Comply with regulations – Comply with rules, regulations and guidelines related to a specific field or sector and apply them in their daily work.

7. Learning Outcomes

Knowledge	Know the principles and stages of teamwork. Know ways to communicate and collaborate effectively. Know the principles of professional ethics and deontology. He is familiar with the applicable procedures and quality standards.
Skills	Actively participates in team activities, contributing to the achievement of common goals. Demonstrates the ability to negotiate and resolve conflicts constructively. Correctly apply activity-specific regulations, procedures, and instructions. Propose solutions to improve compliance with rules and procedures.
Responsibilities and autonomy	They take on their own tasks and respect the deadlines set in the team. Contribute to a positive and productive team climate. Respects the principles of professional ethics in all activities carried out. It contributes to the promotion of an organizational culture based on compliance and integrity. Manifestation of ethical behavior and a professional attitude in the engineering activity.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	Development of generic theoretical and practical skills in engineering sciences. Providing the engineering knowledge fund specific to the field of systems engineering. Development of competences and abilities for the research, development, design and implementation of specific processes, products and services. Development of the knowledge necessary for technical-economic analyses. Development of strategic partnerships with the business environment to facilitate the access and insertion of graduates on the local, national and European labor market.
8.2 Specific objectives	Fundamental engineering training. Ensure knowledge of computer graphics and computer-aided graphic design skills. Provide general technical knowledge in the field of systems engineering. Ability to conceive, promote and carry out group projects. Acquire the skills to integrate technical knowledge specific to all categories of processes and products. Acquiring the ability to direct the quality of products from the design stage, to control and verify the final quality of products and processes.

9. Contents

9.1 Course	**Teaching methods**	**Observations**
Course bibliography		

9.2 Seminar/workshop	Teaching methods	Observations
Athletics: elements from the school of running and jumping.	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	3 hours
Fitness/Jogging	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
Elements of gymnastics: front exercises and formations	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
Table tennis	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
Sports games: basketball, volleyball, football	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	3 hours
Combat/Self-defense	Presentations, Demonstrations, Intuitive Demonstrations, Explanations with Demonstrations	2 hours
	Total	14 hours
Seminar bibliography	8. Bushman, B., 2011, Complete guide to fitness and health, Human Kinetics, Champaign, IL; 9. CORBIN, B. C., RUTH, L., 2007, Fitness for life, Human Kinetics, Champaign, IL; 10. DRAGNEA, A., BOTA, A., 1999, Theory of Motor Activities, Didactic and Pedagogical Publishing House, Bucharest; 11. IONESCU, A., MAZILU, V., 1971, Physical Exercise in the Service of Health, Stadion Publishing House, Bucharest; 12. SCARLAT, E., SCARLAT, M. B., 2011, Treatise on Physical Education, Didactic and Pedagogical Publishing House, Bucharest; 13. ULMEANU, I., 1966, Notions of Physiology with Applications to Physical Exercises, UCFS Publishing House, Bucharest. 14. Vlad bag – electronic laboratory on the SUMS platform, 2025.	

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

Through its contents, the discipline has a pronounced pragmatic character, contributing to the training of specialists in the field of specialization through the following: harmonious development of the body; optimizing health; optimizing health; preventing the onset of global and segmental physical deficiencies, forming and maintaining the correct attitudes of the body; stimulating students' interest in the systematic and independent practice of physical exercise individually and collectively on a daily or weekly basis;

creating the habit of observing the rules of sports hygiene and accident prevention; developing the capacity for self-defense and self-improvement.

11. Rating

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course			
11.2 Seminar	Active participation in classes. Disposition to physical and intellectual effort. Suitable equipment. Appropriate attitude for teamwork.	Execution of exercises as number and correctness. Continuous evaluation throughout the activity. Tests during the semester and their grading. Reports for those who are exempt.	70% 10% 10% 10%
11.3 Minimum Performance Standard Minimum 5 attendances at Physical Education and Sports classes Control Tests: Speed Running 20m Squats: 20 reps Long jump from the spot without momentum			

Date of completion
20.09.2025

Signature of the course holder

Signature of the seminar instructor
Assist.univ.phd. Vlad Adrian Geantă

Date of approval in the department
26.09.2026

Signature of the department director
Assoc.prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	PHYSICS
2.2 Course Lecturer:	Senior Lecturer dr. Sabina Raluca ICĂ
2.3 Seminar Instructor:	Senior Lecturer dr. Sabina Raluca ICĂ
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	EXAMINATION
2.7 Course Status:	DF-compulsory

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

3.1 Hours per week:	4	of which 3.2 lecture	2	3.3 Seminar	1
3.4 Total hours in the study plan	42	of which 3.5 lecture	28	3.6 Seminar	14

Time allocation:	Hours
Study based on course materials, bibliography	10
Additional documentation in library, specialized databases, or field work	10
Preparation for seminars/labs, essays, portfolios	5
Tutoring	5
Examinations	3
Other activities...	
3.7 Total hours of individual study	33
3.8 Total hours per semester	75
3.9 Number of credits	3

4. Preconditions (where applicable)

4.1 of curriculum	-
4.2 of competences	-

5. Conditions (where applicable)

5.1 of conducting the course	Classroom, blackboard, chalk, projector
5.2 of conducting the seminar	Seminar room, blackboard, chalk,

6. Specific Competencies Acquired

Professional Competencies	- C3. Iinclude new products in the production process.
Transversal Competencies:	- CT1. They work effectively in a team, showing trust, responsibility and the ability to carry out their own tasks in support of common goals.

7. Learning Outcomes

Knowledge	- Identify and explain the fundamental laws and concepts of physics applicable in engineering. - It correlates physical phenomena with technical applications and other scientific fields. - Know ways to communicate and collaborate effectively.
Skills	- Apply physical principles and methods in solving engineering problems. - Perform basic experimental measurements and interpretations. - It verifies and validates the solutions obtained through logical reasoning and calculations. - Actively participates in team activities, contributing to the achievement of common goals.
Responsibilities and autonomy	- Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. - Can work independently or in a team to implement and test automation solutions in a real professional environment. - They take on their own tasks and respect the deadlines set in the team.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	- The discipline has as its general objective the formation of a solid scientific basis regarding the concepts, laws and fundamental methods of physics, necessary for understanding, modeling and analyzing the technical processes that underlie engineering activities.
8.2 Specific objectives	- Understanding the fundamental laws of physics. - Application of physical concepts in the analysis and modeling of technical processes. - The use of mathematical and experimental methods in the study of physical phenomena. - Training of practical skills in making and interpreting measurements.

9. Contents

9.1 Course	**Teaching methods**	**Observations**
1. I. Mechanics (Measurements. Physical sizes. Cinematics. Dynamics. The laws of Newtonian mechanics. Conservation laws. The moment of strength. The kinetic moment. Moments of inertia. Fluid mechanics. Oscillations and waves.)	Participatory lecture, exposition, problematization, demonstration, modeling.	7 hours
2. Thermodynamics (Thermodynamic systems. Status parameters. The equation of state of ideal gas. Principles of thermodynamics. The simple transformations of the ideal gas. Mechanical work and heat. Heat engines - efficiency. The Otto cycle. Diesel cycle.	Participatory lecture, exposition, problematization, demonstration, modeling.	7 hours
3 Electricity and magnetism (Electric charge. Coulomb's law. Electric current. Electrical resistance. Ohm's law. Kirchhoff's theorems. The magnetic field. Electromagnetic induction. AC. Reactance. Impedance. The resonance of tensions. The resonance of currents.	Participatory lecture, exposition, problematization, demonstration, modeling.	7 hours

Oscillating circuit. Electromagnetic waves.)		
4. Optics -Reflection and refraction of light. Optical instruments. Light interference and diffraction.	Participatory lecture, exposition, problematization, demonstration, modeling.	2 hours
5. Elements of quantum physics (Structure of the atom. Atomic models. The atomic nucleus. Principles of quantum mechanics. Leptons and quarks.)	Participatory lecture, exposition, problematization, demonstration, modeling.	5 hours
	Total	28 hours

Course bibliography	1. Ch. Kittel: Mechanics (Berkeley Physics Course), EDP 1982. 2. C. Presură: Physics Narrated, Humanitas Publishing House 2014. 3. G. Ciobanu, O. Gherman, I. Saliu: Molecular, thermodynamic and statistical physics, EDP 1983. 4. E. M. Purcell: Electricity and Magnetism (Berkeley Physics Course), EDP 1982. 5. E.H. Weichman: Quantum Physics (Berkeley Physics Course), EDP 1982. 6. R.A. Seway and J. W. Jewett, Physics for Scientists and Engineers, 10th edition (Books Cole Pub Co., 2018). 7. R. Shankar, Fundamentals of Physics I: Machanics, Relativity and Thermodynamics (Yale University Press, 2019). 8. R. Shankar, Fundamentals of Physics II: Electromagnetism, Optics and Quantum Machanics (Yale University Press, 2020). 9. J. C. Morrison, Modern Physics for Scientists and Engineers, 2nd edition (Academic Press, 2015). 10. Ică Raluca, Lecture note in electronic format on the SUMS platform, 2025.

9.2 Seminar	**Teaching methods**	**Observations**
1. Vector Operations Problems - Material Point Kinematics Problems	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours
2. Material Point Dynamics Problems –	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours
3 Ideal Gas Transformation Problems - Thermal Engine Efficiency Problems	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours
4. Electrostatic and DC problems.	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours
5. AC Problems	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	2 hours

6. Recap Issues	Participatory lecture, problematization, modeling, solving exercises and problems, practical works	4 hours
	Total	14 hours

Seminar bibliography	1. Ch. Kittel: Mechanics (Berkeley Physics Course), EDP 1982. 2. C. Presură: Physics Narrated, Humanitas Publishing House 2014. 3. G. Ciobanu, O. Gherman, I. Saliu: Molecular, thermodynamic and statistical physics, EDP 1983. 4. E. M. Purcell: Electricity and Magnetism (Berkeley Physics Course), EDP 1982. 5. E.H. Weichman: Quantum Physics (Berkeley Physics Course), EDP 1982. 6. R.A. Seway and J. W. Jewett, Physics for Scientists and Engineers, 10th edition (Books Cole Pub Co., 2018). 7. R. Shankar, Fundamentals of Physics I: Machanics, Relativity and Thermodynamics (Yale University Press, 2019). 8. R. Shankar, Fundamentals of Physics II: Electromagnetism, Optics and Quantum Machanics (Yale University Press, 2020). 9. J. C. Morrison, Modern Physics for Scientists and Engineers, 2nd edition (Academic Press, 2015). 10. Ică Raluca, Seminar note in electronic format on the SUMS platform, 2025.

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

Through its contents, the discipline has a pronounced pragmatic character, contributing to the formation of basic knowledge for a future engineer.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1. Course	Solving the proposed topics	Written Assessment	50%
11.2 Seminar	Solving the proposed problems	Practical assessment	50%
11.3 Minimum Performance Standard Solving 50% of the exam topics and passing the seminar problems with a grade of 5.			

Date of completion 20.09.2025

Signature of the course holder
Senior lecturer.dr. Sabina Raluca Ică

Signature of the seminar instructor
Senior lecturer.dr. Sabina Raluca Ică

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.Prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	COMPUTER-AIDED GRAPHICS 1
2.2 Course Lecturer:	Senior lecturer dr. eng. Andrei KOMJATY
2.3 Laboratory Instructor:	Senior lecturer dr. eng. Andrei KOMJATY
2.4 Year of Study:	1
2.5 Semester	1
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DF-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week	2	of which 3.2 lecture	1	3.3 Laboratory	1
3.4 Total hours in the study plan	28	of which 3.5 lecture	14	3.6 Laboratory	14

Time allocation:	Hours
Study based on course materials, bibliography	4
Additional documentation in library, specialized databases, or field work	4
Preparation for seminars/labs, essays, portfolios	4
Tutoring	6
Examinations	4
Other activities...	-
3.7 Total hours of individual study	22
3.8 Total hours per semester	50
3.9 Number of credits	2

4. Preconditions (where applicable)

4.1 of curriculum	**Programming and using the computer**
4.2 of competences	Identifying, defining, using notions in the field of engineering sciences; Use of graphic principles and tools for describing and presenting elements in the engineering field.

5. Conditions (where applicable)

5.1 of conducting the course	Classroom / amphitheater, equipped with video projector, smart board, laptop.
5.2 of conducting the laboratory	Laboratory room.

6. Specific Competencies Acquired

ESCO Competencies	C3. Include new products in the production process – Help integrate new systems, products, methods, and components into the production line. It ensures that production workers are properly trained and comply with new requirements.
Transversal competences	CT3. Analytical thinking.

7. Learning Outcomes

Knowledge	He has knowledge of the operation of some methods, algorithms, equipment. Identify how certain products can be included in production. Define performance indicators. Solve problems. Think creatively and innovatively.
Skills	Document and implement procedures for introducing a new product into the manufacturing flow. Propose and validate optimization solutions to reduce costs and increase efficiency. Think analytically. Think critically. Think creatively.
Responsibilities and autonomy	Can work independently or in a team to implement and test automation solutions in a real professional environment. Has the ability to manage technical projects responsibly and on time. Approach problems critically.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	Knowledge and use of notions in the engineering field.
8.2 Specific objectives	1. Knowledge and understanding Knowledge and understanding of the terms "Machine Organ", "Machine" as well as understanding the kinematic links that govern the operation of any equipment. 2. Explanation and interpretation Correct and optimal correlation of the knowledge acquired in Drawing, Mechanics, Mechanisms and Resistance of materials. To acquire the knowledge necessary to design an industrial product. 3. Instrumental – applicative Highlighting the demands in terms of meaning and value, which act on the machine parts at rest or in motion. 4. Attitudinal Manifestation of positive and responsible attitudes towards the scientific and technical field. Optimal and creative exploitation of one's own potential in scientific and technical activities. Involvement in the promotion and development of scientific and technical innovations. Participation in one's own professional and scientific development.

9. Contents

9.1 Course	Teaching methods	Observations
Introductory notions in technical drawing	Participatory lecture, debate, exposition, problematization, demonstration, modeling, study by discovery, bibliographic study,	6 hours
Familiarization with industrial technical drawing, standards, representations, views.		8 hours
	Total	14 hours
Course bibliography	[1] Komjaty A. – GAC / DTI course – SUMS platform, 2025. [2] Barlida C.. – Technical drawing and infographics, Polytechnic University, Timisoara, 2014. [3] Practice Tutor: Mechanical Design Technician. Polytechnic University of Bucharest, 2013. [4] SolidWorks User Manuals, 2025.	

9.2 Laboratory	Teaching methods	Observations
Introductory notions, types of lines, indicator, border.	Conversation, Debate, Cooperative learning, Teamwork	2 hours
Notions about projections, sections, ruptures.	Conversation, Debate, Cooperative learning, Teamwork	2 hours
Listing	Conversation, Debate, Cooperative learning, Teamwork	2 hours
Sketch	Conversation, Debate, Cooperative learning, Teamwork	2 hours
Introduction to SolidWorks	Conversation, Debate, Cooperative learning, Teamwork	6 hours
	Total	14 hours
Laboratory bibliography	[1] Komjaty A. – GAC / DTI course – SUMS platform, 2025. [2] Barlida C.. – Technical drawing and infographics, Polytechnic University, Timisoara, 2014. [3] Practice Tutor: Mechanical Design Technician. Polytechnic University of Bucharest, 2013. [4] SolidWorks User Manuals, 2025.	

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

First of all, the university curricula for a study program must be structured based on the proposals of the social partners of the higher education institution (especially research, design, construction, maintenance and operation companies), so that the graduate of the respective study program is easy to enter the labor market, immediately after completing the first cycle of studies (bachelor's degree), thus being stimulated to participate in master's and doctoral courses, organized in collaboration with the social partners.
In the case of the study program: AIA, when drawing up the university curriculum, the standards in the field with immediate applicability must be taken into account, thus ensuring a compatibility of the curricula with the European ones as well as a better mobility of students through European programs (SOCRATES/ERASMUS, Leonardo da Vinci, Tempus II, etc.).

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Correctness and completeness of knowledge. Logical coherence. The degree of assimilation of the specialized language.	Active participation in courses.	40%
11.2 Laboratory	Students' ability to form and develop practical skills.	Practical Method + Computer-Aided Assessment (at the end of the semester)	30%
	Active participation of students in laboratory work.	Oral + practical method (during the semester)	30%
11.3 Minimum Performance Standard			
Elaboration of a synthesis work in the field of Technical Drawing, using pre-established criteria (60% weight).			

Date of completion 20.09.2025

Signature of the course holder
Senior lecturer.dr.eng. Andrei Komjaty

Signature of the laboratory instructor
Senior lecturer.dr.eng. Andrei Komjaty

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.Prof. dr.eng. Valentin Dan Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty	FACULTY OF ENGINEERING
1.3 Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORT
1.4 Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle	BACHELOR OF SCIENCE
1.6 Study Programme/Qualification	AUTOMATION AND APPLIED INFORMATICS IN (ENGLISH) (AIA-E)

2. Course Information

2.1 Name of the discipline	LINEAR ALGEBRA, ANALYTIC AND DIFFERENTIAL GEOMETRY
2.2 Course activity holder	Prof.univ.dr. Ghiocel MOȚ
2.3 Seminar activity instructor	Senior Lecturer dr. Claudia Luminița MIHIȚ
2.4 Year of study	1
2.5 Semester	1
2.6 Type of assessment	EXAMINATION
2.7 Discipline regime	DF-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week	4	of which 3.2 lecture	2	3.3 Seminar	2
3.4 Total hours in the study plan	56	of which 3.5 lecture	28	3.6 Seminar	28

Time allocation:	Hours
Study based on course materials, bibliography	12
Additional documentation in library, specialized databases, or field work	12
Preparation for seminars/labs, essays, portfolios	12
Tutoring	4
Examinations	4
Other activities...	
3.7 Total hours of individual study	44
3.8 Total hours per semester	100
3.9 Number of credits	4

4. Preconditions (where applicable)

4.1 of curriculum	Fundamental knowledge of mathematics according to the high school curriculum.
4.2 of competences	Oral and written communication. Operating with algebraic and geometric notions and methods. Proving algebraic and geometric results using different mathematical concepts and reasoning.

5. Conditions (where applicable)

5.1 of conducting the course	Internet access The classroom equipped with a writing board Computer/Laptop and Video Projector
5.2 of conducting the seminar	Internet access Specific equipment and apparatus Writing board

6. Specific Competencies Acquired

Professional competencies	C1. Perform analytical mathematical calculations - Apply mathematical methods and use computational technologies to perform analysis and devise solutions to specific problems.
Transversal competencies	CT3. Analytical thinking

7. Learning Outcomes

Knowledge	Graduate: • Knows and identifies mathematical methods (linear algebra, numerical analysis) for modeling and solving engineering problems. •Uses specific software tools (e.g. MATLAB) to automate analytical calculations and verify mathematical solutions in real contexts. • Solve problems, think creatively and innovatively.
Skills	Graduate: •Applies advanced mathematical methods (linear algebra, numerical analysis) for modeling and solving engineering problems. •Uses specific software tools (e.g. MATLAB) to automate analytical calculations and verify mathematical solutions in real contexts. •Thinks analytically and creatively.
Responsibilities and autonomy	Graduate: • Evaluates and optimizes the performance of the designed system, assuming responsibility for choosing technical solutions. •Can work independently or in a team to implement and test automation solutions in a real professional environment. •Has the ability to manage technical projects responsibly and on time. •Has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control). • Manifestation of ethical behavior and a professional attitude in the engineering activity. •Approaches the problem critically.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1 General objective of the discipline	-The student to know and understand the basic notions of algebra, analytic geometry and differential geometry. - The student to develop the skills to correctly apply the theoretical knowledge accumulated for problem solving.
8.2 Specific objectives	- The student is able to demonstrate that he has acquired sufficient knowledge to understand notions such as: algebraic structure, group, semigroup, monoid, ring, field, linear space and subspace, linear dependence, bases, size, linear forms, bilinary, square forms; that he knows the equations of planes, lines, conics, squares, curves and surfaces. -The student is able to correctly select and apply the basic methods and principles learned in solving the problems of linear algebra, analytic geometry and differential geometry.

9. Contents

9.1 Course	**Teaching methods**	**Observations**
Chapter 1. General Algebraic Structures 1.1. Internal and external algebraic	Participatory lecture, problematization, demonstration, exemplification	6 hours

operations. Examples. Properties 1.2. Outstanding algebraic structures		
Chapter 2. Linear spaces 2.1. Definition of linear spaces. Properties 2.2. Outstanding linear spaces 2.3. The linear dependence of a system of vectors on a linear space 2.4. Bases of a linear space. Dimension. Changes of bases and coordinates 2.5. Linear subspaces	Participatory lecture, problematization, demonstration, exemplification	2 hours
Chapter 3. Linear space of free vectors 3.1.Free vectors and bound vectors in 3-dimensional physical space 3.2.Products of two vectors in V3. The dot product and the vector product of two free vectors in V3 3.3.Products of three vectors in V3. The mixed product and the double vector product of three vectors in V3. 3.4.Coordinate systems	Participatory lecture, problematization, demonstration, exemplification	2 hours
Chapter 4. Linear applications. Linear, bilinear and square forms 4.1.Linear applications between linear spaces. The matrix associated with a linear application 4.2. Systems of linear equations 4.3. Linear shapes. Dual Space 4.4. Bilinear forms on a linear space 4.5. Quadratic shapes associated with a symmetrical bilinear shape on a linear space	Participatory lecture, problematization, demonstration, exemplification	4 hours
Chapter 5. Euclidean spaces, normed spaces, metric spaces 5.1.Dot product. Euclidean Space 5.2. Norm. Normed space 5.3.Distance. Metric space	Participatory lecture, problematization, demonstration, exemplification	2 hours
Chapter 6. Linear manifolds in physical space. Ruled and rotating surfaces 6.1. The Plan in Physical Space 6.2. Right in physical space. 6.3.Ruled surfaces. Cylindrical, conical, conical surfaces 6.4. Rotation surfaces	Participatory lecture, problematization, demonstration, exemplification	2 hours
Chapter 7. Conical and square. 7.1. Conics, definition, deduction of equations. 7.2. Reducing the general equation of a conic to the canonical equation 7.3. Quadriceps, reduced equation 7.4. Reducing the general equation of a quadratic to the canonical equation	Participatory lecture, problematization, demonstration, exemplification	2 hours
Chapter 8. Differential geometry of plane curves 8.1.Analytical representation of plane curves 8.2. The arc element of a plane curve 8.3. Tangent and Normal at a Point of a Planar Curve 8.4.Tangent and Normal, Tangent and Subnormal Segments 8.5.Singular Points of a Planar Curve 8.6. Common plane curves 8.7.Curvature of a plane curve 8.8. Contact of two plane curves 8.9.The osculatory circle 8.10.The winding of a	Participatory lecture, problematization, demonstration, exemplification	2 hours

family of plane curves 8.11.The evolution of a plane curve 8.12.The evolution of a plane curve		
Chapter 9. Differential geometry of curves in space 9.1.Analytical representation of curves in space 9.2. The element of arc 9.3.Tangent and the plane normal to the curve of space 9.4. Frenet's trihedron 9.5. Frenet's forms. The curvature and torsion of a curve in space 9.6.The osculating circle at a point of a curve in space 9.7.The winding of a family of curves in space 9.8. The evolution of a curve in space 9.9. The evolution of a curve in space	Participatory lecture, problematization, demonstration, exemplification	2 hours
Chapter 10. Differential geometry of surfaces 10.1.Analytical representation of surfaces 10.2. Curves drawn on a surface 10.3. Tangent plane at a point on a surface 10.4.Normal plane at a point on a surface 10.5. The first fundamental shape of a surface The length of a curved arc drawn on a surface 10.6. Area element of a surface 10.7. Curvature of curves drawn on a surface 10.8. The second fundamental form of a surface 10.9. Total curvature and medium curvature	Participatory lecture, problematization, demonstration, exemplification	4 hours
	Total	28 hours

Course bibliography

1. BOJA, N., Analytical and differential geometry with applications, Ed. Politehnica, Timișoara 2008.
2. MATEI, P., Linear Algebra and Analytical Geometry. Collection of problems, Ed. MatrixRom, 2007.
3. MOȚ, G., POPA, L., Linear algebra. Collection of problems, Mirton Publishing House, Timișoara, 1999.
4. MOȚ, G., PETRUSEL, A., Superior Mathematics for Engineers and Economists, Mirton Publishing House, Timișoara, 1999.
5. MOȚ, G. et al., Mathematical Exercises and Problems for the Students of Technical and Economic Profiles, Ed Arădeana, 2003.
6. MOT, G., POPA, L., Superior Algebra for Technical and Economic Profiles. Theory and Applications, Univ. "Aurel Vlaicu" Publishing House, Arad, 2010.
7. MOȚ, G., POPA, L.., Linear algebra. Analytical and differential geometry. Univ. Ed. "Aurel Vlaicu" Arad, 2014.
8. MOȚ, G., MIHIȚ, C., Course and seminar notes-Linear algebra. Analytical and Differential Geometry, SUMS, 2025.

9.2 Seminar	**Teaching methods**	**Observations**
1. Internal and external algebraic operations	Exercises, applications, debates	2 hours
2. Remarkable algebraic structures	Exercises, applications, debates	2 hours
3. Linear spaces and subspaces	Exercises, applications, debates	2 hours
4. Linearly dependent and independent vectors. Databases	Exercises, applications, debates	2 hours

5. Products of two and three vectors. Applications	Exercises, applications, debates	2 hours
6. Linear applications. Linear shapes. Bilinear forms. Quadratic forms	Exercises, applications, debates	2 hours
7. Euclidean spaces. Normed linear spaces	Exercises, applications, debates	2 hours
8. Orthonormalization. Metric Spaces	Exercises, applications, debates	2 hours
9. The plan. Right. Surface Generation	Exercises, applications, debates	2 hours
10. Conics and squares	Exercises, applications, debates	2 hours
11. Plane curves. Differential elements of a plane curve	Exercises, applications, debates	2 hours
12. Curves in space. Differential elements of a curve in space	Exercises, applications, debates	2 hours
13. Surfaces. Differential elements of a surface	Exercises, applications, debates	2 hours
14. The first fundamental form. The area element. The angle of two curves on a surface. The second fundamental form of a surface	Exercises, applications, debates	2 hours
	Total	28 hours

Seminar bibliography

1. BOJA, N., Analytical and differential geometry with applications, Ed. Politehnica, Timișoara 2008.
2. MATEI, P., Linear Algebra and Analytical Geometry. Collection of problems, Ed. MatrixRom, 2007.
3. MOȚ, G., POPA, L., Linear algebra. Collection of problems, Mirton Publishing House, Timișoara, 1999.
4. MOȚ, G., PETRUSEL, A., Superior Mathematics for Engineers and Economists, Mirton Publishing House, Timișoara, 1999.
5. MOȚ, G. et al., Mathematical Exercises and Problems for the Students of Technical and Economic Profiles, Ed Arădeana, 2003.
6. MOT, G., POPA, L., Superior Algebra for Technical and Economic Profiles. Theory and Applications, Univ. "Aurel Vlaicu" Publishing House, Arad, 2010.
7. MOȚ, G., POPA, L.., Linear algebra. Analytical and differential geometry. Univ. Ed. "Aurel Vlaicu" Arad, 2014.
8. MOȚ, G., MIHIȚ, C., Course and seminar notes-Linear algebra. Analytical and Differential Geometry, SUMS, 2025.

10. Corroboration/validation of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

The content of the discipline is in accordance with what is done 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 representatives of the business environment and with teachers of mathematics and computer science from the pre-university education in Arad.

11. Rating

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Verification of knowledge about the main notions of	Written exam	50%

	algebra, analytical geometry and differential geometry.		
11.2 Seminar	Checking the basic exercises of algebra, analytical geometry and differential geometry.	Partial tests	50%
11.3 Minimum Performance Standard Knowledge of the basics of algebra, analytic geometry and differential geometry.			

Date of completion 20.09.2025	Signature of the course holder Prof.dr. Ghiocel Moț	Signature of the seminar instructor Senior Lect.dr. Claudia Luminița Mihiț

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1. Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2. Faculty	FACULTY OF ENGINEERING
1.3. Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4. Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5. Study Cycle	BACHELOR OF SCIENCE
1.6. Study Program/Qualification	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title	ELECTRICAL ENGINEERING 1
2.2 Course Lecturer	Assoc. Prof. Dr. Valentin Dan MULLER
2.3 Seminar/Laboratory Instructor	Assistant, PhD. Eng. Mihaela POPA
2.4 Year of Study	1
2.5 Semester	1
2.6 Type of Assessment	EXAMINATION
2.7 Course Status	DS-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week	5	of which 3.2 lecture	2	3.3 Seminar/laboratory	2/1
3.4 Total hours in the study plan	70	of which 3.5 lecture	28	3.6 Seminar/laboratory	28/14

Time allocation:	Hours
Study based on course materials, bibliography	15
Additional documentation in library, specialized databases, or field work	10
Preparation for seminars/labs, essays, portfolios	10
Tutoring	5
Examinations	5
Other activities...	10
3.7 Total hours of individual study	55
3.8 Total hours per semester	125
3.9 Number of credits	5

4. Preconditions (where applicable)

4.1.de curriculum	Mathematical Analysis, Linear Algebra and Differential Equations, Physics
4.2.de competences	Knowledge and appropriate use of the notions specific to the discipline; Knowledge and deepening of some fundamental notions in physics

5. Conditions (where applicable)

5.1 of conducting the course	Classroom or classroom equipped with IT systems (video projector, etc.).
5.2 of conducting the seminar and laboratory	Specialized laboratories within the institution or within partner companies

6. Specific Competencies Acquired

Professional Competencies	- C3. Include new products in the production process – Help integrate new systems, products, methods, and components into the production line. It ensures that production workers are properly trained and comply with new requirements.
Transversal Competencies:	- CT3 – Thinks analytically

7. Learning Outcomes

Knowledge	- Graduate: - He has knowledge of the operation of some methods, algorithms, equipment. - Identify how certain products can be included in production. - It processes information, ideas and concepts. - Solve problems. - Think creatively and innovatively.
Skills	- Graduate: - Document and implement procedures for introducing a new product into the manufacturing flow. - It ensures the training of operators and the adaptation of equipment to the requirements of the new product. - Think analytically. - Think critically. - Think creatively.
Responsibilities and autonomy	- Graduate: - Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. - Can work independently or in a team to implement and test automation solutions in a real professional environment. - Has the ability to manage technical projects responsibly and on time. - It has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control). - Manifestation of ethical behavior and a professional attitude in the engineering activity. - It analyzes experimental laboratory data. - Develop new installations.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1.General objective of the discipline	The fundamental training necessary for the study of various specialized electrical disciplines is provided.
8.2.Specific objectives	Use of the basics of the field.

9. Content

9.1 Course	**Teaching methods**	Observations
1. General considerations on the study of electromagnetic phenomena • Electromagnetic phenomena • Some basic concepts • Theories of electromagnetic phenomena • Regimes of electromagnetic phenomena	Oral presentation, completed with the presentation of images (video projector, etc.)	2 hours
2. Electrostatic regime • Electrical load. The electric field. • The Law of Electric Flow • Electrical potential. Electrical voltage • Conductive Materials in Electrostatic Field • Dielectric Polarization	Oral presentation, completed with the presentation of images (video projector, etc.)	4 hours

3. Electrokinetic regime • The intensity of the electric current. Current Density • The Law of Electric Conduction • The Law of Transforming Energy into Conductors Traversed by Currents • Law of Conservation of Electric Charge • The law of electrolysis	Oral presentation, completed with the presentation of images (video projector, etc.)	4 hours
4. Electrical circuits - general considerations, definitions, laws, theorems	Oral presentation, completed with the presentation of images (video projector, etc.)	2 hours
5. Passive circuit elements and their parameters • Electrical resistance. Resistors. Resistor grouping. Electrical Transfigurations • Insulating materials • Capacitors. Electrical capacity. Capacitor Grouping	Oral presentation, completed with the presentation of images (video projector, etc.)	2 hours
6. DC Electrical Circuits • Calculation methods of linear electrical circuits • Theorems ▪ Kirchhoff's theorems ▪ Contour current theorem ▪ Potentials theorem ▪ The superposition theorem ▪ Reciprocity theorem ▪ Theorem of Voltage and Current Equivalent Generators ▪ Vaschy's theorem ▪ Conservation of powers theorem • Nonlinear DC circuits	Oral presentation, completed with the presentation of images (video projector, etc.)	8 hours
7. Steady state of the magnetic field • Magnetic induction. The Law of Magnetic Flux • Magnetization of Bodies • Forces and energy in the magnetic field • Calculation of magnetic circuits	Oral presentation, completed with the presentation of images (video projector, etc.)	6 hours
	Total	28 hours

Bibliography:

1. Müller V. Electrotechnics, Course Notes - electronic support, 2025.
2. Heşca V., Electrotechnics Course, "Aurel Vlaicu" University of Arad, 1991.
3. Heşca V., Electrotechnics and Electronics, "Aurel Vlaicu" University of Arad Publishing House, 1997.
4. Şora C., The Basics of Electrotechnics, Didactic and Pedagogical Publishing House, Bucharest, 1982.
5. Heşca V., Popa M., Electrotechnics and Electric Machines, "Aurel Vlaicu" University of Arad, 1997.
6. Vetreş I., Colţeu A., Electrotehnica şi maşini electrice. Problems. "Traian Vuia" Polytechnic Institute Timişoara, 1982.
7. Răduleţ R., The Basics of Electrotechnics, Didactic and Pedagogical Publishing House, Bucharest, 1980.

9.2 Seminar	**Teaching methods**	Observations

1. Electric Field State Quantities	Oral presentation	4 hours
2. Electric Field Laws	Oral presentation	4 hours
3. Passive circuit elements and their parameters 1.1. Calculation of the equivalent resistance 1.2. Capacitors and capacitors.	Oral presentation	4 hours
4. Electrokinetic regime	Oral presentation	2 hours
5. Methods of solving DC electrical circuits	Oral presentation	8 hours
6. Magnetic Field State Quantities	Oral presentation	2 hours
7. Magnetic Field Laws	Oral presentation	4 hours
	Total	28 hours
9.3 Laboratory	**Teaching methods**	Observations
1. Voltage and Current Measurement	Mounting	2 hours
2. Measurement of electrical resistances	Mounting	2 hours
3. Power measurement in DC circuits	Mounting	2 hours
4. Study of single-phase electrical circuits	Mounting	2 hours
5. Measuring Power and Energy in Single-Phase AC Circuits	Mounting	2 hours
6. Experimental determination of electrical impedances	Mounting	2 hours
7. Recoveries and conclusion of the situation at the laboratory		2 hours
	Total	14 hours

Bibliography:

1. Muller V. Electrotechnics, Laboratory and Seminar Notes - Electronic Support, 2025.
2. Heşca V., Popa M., Electrotechnics and Electric Machines, "Aurel Vlaicu" University of Arad, 1997.
3. Vetreş I., Colţeu A., Electrotechnics and Electrical Machines. Problems. "Traian Vuia" Polytechnic Institute Timişoara, 1982.
4. Răduleţ R., The Basics of Electrotechnics Problems, Didactic and Pedagogical Publishing House, Bucharest, 1981
5. Popa Mihaela, Electrotechnics – laboratory and seminar works – electronic format, 2025.

10. Corroboration of the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers representative in the field related to the program

The content of the course and the laboratory works has been developed and adapted according to the requests of the department that manages the study program, requests that meet the expectations of the representatives of the epistemic community and the representative employers in the field related to the study program

11. Assessment

Type of activity	11.1 Evaluation criteria	11.2 Evaluation methods	11.3 Percentage of final grade
11.1 Course	Final Review	Written exam.	70%
	Course evaluation through questions related to the content of the current course	It is found during the course of semester within	10%

		interactive activities and attendance at activities.	
11.2 Seminar/Workshop	Laboratory Colloquium	Verification by: method observation of the practical activity carried out; through survey questions on theoretical problems prepared for practical activity; through Questions about Interpretation of results experimental experiments obtained in laboratory. The grading scale is communicates to the students with the enunciation of the problems from the first laboratory session	20 %
11.3 Minimum Performance Standard			
In order to pass the exam, the student must obtain at least a grade of 5. • Knowledge of the fundamental laws and theorems of electrical engineering			

Date of completion Signature of the course holder Signature of the seminar / laboratory instructor
20.09.2025 Assoc.Prof. dr.eng. Valentin Dan Muller Assist.drd.eng. Mihaela POPA

Date of approval in the department Signature of the department director
26.09.2025 Assoc.Prof. dr.eng. Valentin Dan Muller

Date of approval in the faculty council Approval from the Dean
29.09.2026 Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

24. Program Information

1.1 Higher Education Institution:	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty:	FACULTY OF ENGINEERING
1.3 Department:	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4 Field of Study:	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study Cycle:	BACHELOR OF SCIENCE
1.6 Study Program / Qualification:	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

25. Course Information

2.1 Course Title:	ELECTRICAL ENGINEERING 2
2.2 Course Lecturer:	Assoc.prof.dr.eng. Valentin Dan MULLER
2.3 Seminar/Laboratory Instructor:	Assistant PhD. Eng. Mihaela POPA
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	EXAMINATION
2.7 Course Status:	DS-compulsory

26. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week	5	of which 3.2 lecture	2	3.3 seminar/laboratory	2/1
3.4 Total hours in the study plan	70	of which 3.5 lecture	28	3.6 seminar/laboratory	28/14

Time allocation:	Hours
Study based on course materials, bibliography	15
Additional documentation in library, specialized databases, or field work	10
Preparation for seminars/labs, essays, portfolios	10
Tutoring	5
Examinations	5
Other activities...	10
3.7 Total hours of individual study	55
3.8 Total hours per semester	125
3.9 Number of credits	5

27. Preconditions (where applicable)

4.1 of curriculum	Mathematical Analysis, Linear Algebra and Differential Equations, Physics
4.2 of competences	Knowledge and appropriate use of the notions specific to the discipline; Knowledge and deepening of some fundamental notions in physics

28. Conditions (where applicable)

5.1 of conducting the course	Classroom or classroom equipped with IT systems (video projector, etc.).
5.2 of conducting the seminar and laboratory	Specialized laboratories within the institution or within partner companies

6. Specific Competencies Acquired

Professional Competencies	- C3. Include new products in the production process – Help integrate new systems, products, methods, and components into the production line. It ensures that workers in production are properly trained and comply with new requirements.
Transversal Competencies:	- CT3. Think analytically – Think using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems

7. Learning Outcomes

Knowledge	- He has knowledge of the operation of some methods, algorithms, equipment. - Identify how certain products can be included in production. - It processes information, ideas and concepts. - Solve problems. - Think creatively and innovatively.
Skills	- Document and implement procedures for introducing a new product into the manufacturing flow. - It ensures the training of operators and the adaptation of equipment to the requirements of the new product. - Think analytically. - Think critically. - Think creatively.
Responsibilities and autonomy	- Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. - Can work independently or in a team to implement and test automation solutions in a real professional environment. - Has the ability to manage technical projects responsibly and on time. - It has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control). - Manifestation of ethical behavior and a professional attitude in the engineering activity. - It analyzes experimental laboratory data. - Develop new installations.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1.General objective of the discipline	The fundamental training necessary for the study of various specialized electrical disciplines is provided.
8.2.Specific objectives	Use of the basics of the field.

9. Content

9.1 Course	**Teaching methods**	Observations
8. Variable electromagnetic field regime • The Law of the Magnetic Circuit • The Law of Electromagnetic Induction • Electromagnetic energy. Film effect • Maxwell's equations	Oral presentation, completed with the presentation of images (video projector, etc.)	4 hours
9. Passive circuit elements and their parameters • Magnetic Materials • Magnetic circuits. Magnetic reluctance • Electric coils. Inductivities	Oral presentation, completed with the presentation of images (video projector, etc.)	4 hours

• Magnetically coupled coils. Mutual inductivity		
10. Single-phase AC electrical circuits • Characteristic sizes • Linear circuits in sinusoidal steady state • Equivalent impedance • Electrical Powers in AC Circuits • The Power Factor and Its Enhancement • Calculation methods of single-phase circuits • Magnetically coupled circuits • Transient Linear Electrical Circuits	Oral presentation, completed with the presentation of images (video projector, etc.)	8 hours
11. Three-phase electrical circuits • Three-phase systems. Characteristic sizes • Three-phase circuit connections • Electrical powers in three-phase circuits • Active Power Measurement • The Power Factor and Its Enhancement	Oral presentation, completed with the presentation of images (video projector, etc.)	6 hours
12. Electrical circuits with distributed parameters	Oral presentation, completed with the presentation of images (video projector, etc.)	2 hours
13. Transient electrical circuits	Oral presentation, completed with the presentation of images (video projector, etc.)	2 hours
14. Quadripole theory	Oral presentation, completed with the presentation of images (video projector, etc.)	2 hours
	Total	28 hours

Bibliography:

1. Müller V. Electrotechnics, Course Notes - electronic support, 2025.
2. Heşca V., Electrotechnics Course, "Aurel Vlaicu" University of Arad, 1991.
3. Heşca V., Electrotechnics and Electronics, "Aurel Vlaicu" University of Arad Publishing House, 1997.
8. Şora C., The Basics of Electrotechnics, Didactic and Pedagogical Publishing House, Bucharest, 1982.
9. Heşca V., Popa M., Electrotechnics and Electric Machines, "Aurel Vlaicu" University of Arad, 1997.
10. Vetreş I., Colţeu A., Electrotehnica şi maşini electrice. Problems. "Traian Vuia" Polytechnic Institute Timişoara, 1982.
7. Răduleţ R., The Basics of Electrotechnics, Didactic and Pedagogical Publishing House, Bucharest, 1980.

9.2 Seminar	**Teaching methods**	Observations
8. Variable electromagnetic field regime	Oral presentation	2 hours
9. Own and mutual inductivities	Oral presentation	2 hours
10. Magnetic circuits. Useful and dispersion inductivities	Oral presentation	2 hours
11. Calculation of magnetic circuits	Oral presentation	2 hours
12. Periodic Quantities and Sinusoidal Alternative Quantities	Oral presentation	4 hours

13. Simple electrical circuits in sinusoidal steady state	Oral presentation	8 hours
14. Three-phase electrical circuits	Oral presentation	6 hours
15. Transient electrical circuits	Oral presentation	2 hours
	Total	28 hours
9.3 Laboratory	**Teaching methods**	Observations
8. R, L, C Series Circuit	Mounting	2 hours
9. Parallel R, L, C circuit	Mounting	2 hours
10. The Power Factor and Its Enhancement	Mounting	2 hours
11. Three-phase circuits	Mounting	2 hours
12. Power measurement in three-phase circuits	Mounting	2 hours
13. Solving electrical circuits with the help of the computer	EN	2 hours
14. Recovery		2 hours
	Total	28 hours

Bibliography seminar and laboratory:

1. Heşca V., Popa M., Electrotechnics and Electric Machines, "Aurel Vlaicu" University of Arad, 1997.
2. Vetreş I., Colţeu A., Electrotehnica şi maşini electrice. Problems. "Traian Vuia" Polytechnic Institute Timişoara, 1982.
3. Răduleţ R., The Basics of Electrotechnics Problems, Didactic and Pedagogical Publishing House, Bucharest, 1981.
4. Muller V., Electrotechnics – laboratory papers – electronic format, 2018.
5. Popa Mihaela Electrotechnics, seminar and laboratory papers - electronic support, 2025.

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The content of the course and the laboratory works has been developed and adapted according to the requests of the department that manages the study program, requests that meet the expectations of the representatives of the epistemic community and the representative employers in the field related to the study program

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Final Review	Written exam.	70%
	Course evaluation through questions related to the content of the current course	It is found during the course of semester within interactive activities and attendance at activities.	10%
11.2 Seminar/Workshop	Laboratory Colloquium	Verification by: method observation of the practical activity carried out; through survey questions on theoretical problems prepared for practical activity; through	20 %

		Questions about Interpretation of results experimental experiments obtained in laboratory. The grading scale is communicates to the students with the enunciation of the problems from the first laboratory session	

11.3 Minimum Performance Standard

- In order to pass the exam, the student must obtain at least a grade of 5.

Knowledge of the fundamental laws and theorems of electrical engineering

Date of completion	Signature of the course holder	Signature of the seminar / laboratory instructor
20.09.2025	Assoc.Prof. dr.eng. Valentin Dan Muller	Assist.dr.eng. Mihaela Popa

Date of approval in the department
Assoc.Prof. dr.eng. Valentin Dan Muller

Signature of the department director 26.09.2025

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1. Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2. Faculty	FACULTY OF ENGINEERING
1.3. Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORT
1.4. Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5. Study Cycle	BACHELOR OF SCIENCE
1.6. Study Program/ Qualification	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1. Course Title	MATHEMATICAL ANALYSIS
2.2. Course Lecturer	Lect.univ. dr. Lavinia SIDA
2.3. Seminar Instructor	Assistant, PhD. Sorin HOARE
2.4. Year of Study	1
2.5. Semester	2
2.6. Type of Assessment	EXAMINATION
2.7. Course Status	DF-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week	3	of which 3.2 lecture	2	3.3 Seminar	1
3.4 Total hours in the study plan	42	of which 3.5 lecture	28	3.6 Seminar	14
Time allocation:					Hours
Study based on course materials, bibliography					20
Additional documentation in library, specialized databases, or field work					20
Preparation for seminars/labs, essays, portfolios					20
Tutoring					10
Examinations					10
Other activities...					3
3.7 Total hours of individual study					83

3.8 Total hours per semester	125
3.9 Number of credits	5

4. Preconditions (where applicable)

4.1. of curriculum	Fundamental knowledge of mathematics according to the high school curriculum.
4.2. of competences	Operating with mathematical notions and methods.

5. Conditions (where applicable)

5.1. Conditions of the course	The classroom equipped with a writing board.
5.2. Conditions for conducting the seminar	Seminar room, properly equipped.

6. Specific competencies acquired (where applicable)

6.1. Professional competencies	C1. Perform analytical mathematical calculations**.**
6.2. Transversal competencies	CT1. Work in teams - Work confidently within a group, each doing his or her part in serving the whole. CT3. Think analytically – Think using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.

7. Learning Outcomes

Knowledge	**Graduate:** Knows and identifies mathematical methods (linear algebra, numerical analysis) for modeling and solving engineering problems. It uses specific software tools (e.g. MATLAB) to automate analytical calculations and verify mathematical solutions in real contexts. Know the principles and stages of teamwork. Know ways to communicate and collaborate effectively. It processes information, ideas and concepts. Solve problems. Think creatively and innovatively.
Skills	**Graduate:** Apply advanced mathematical methods (linear algebra, numerical analysis) for modeling and solving engineering problems. It uses specific software tools (e.g. MATLAB) to automate analytical calculations and verify mathematical solutions in real contexts. Actively participates in team activities, contributing to the achievement of

	common goals. Think analytically. Think critically. Think creatively.
Responsibilities and autonomy	**Graduate** Evaluates and optimizes the performance of the designed system, taking responsibility for choosing technical solutions. Can work independently or in a team to implement and test automation solutions in a real professional environment. Has the ability to manage technical projects responsibly and on time. It has availability for continuous learning and professional adaptation in emerging fields (intelligent automation, IoT, AI in control). Manifestation of ethical behavior and a professional attitude in the engineering activity. Approach problems critically. They take on their own tasks and respect the deadlines set in the team.

8. Objectives of the discipline (**resulting from the grid of specific competences accumulated**)

8.1. General objective of the discipline	The student should know the basics of mathematical analysis, both for functions of a single real variable and for functions of several real variables; The student to develop the ability to operate withdeductive reasons specific to the discipline; The student to use the theoretical concepts learnedin concrete applications; The student must develop the skills to correctly apply the accumulated knowledge to solve different classes of problems.
8.2. Specific objectives	The student is able to demonstrate that he has acquired sufficient knowledge for the correct use of the notions of mathematical analysis; The student is able to correctly apply the basic methods and principles in solving the problems of mathematical analysis; The student is also able to recognize the main classes/types of mathematical analysis problems and to select the appropriate methods and techniques for solving them; The student can carry out projects for the mathematical modeling of a concrete problem.

9. Contents (where applicable)

9.1 Course content	**Teaching methods**	**Observations**

1. Polynomial interpolation. Lagrange's interpolation polynomial. Newton's interpolation polynomial. Taylor's formula. Mac Laurin's formula. 2. Number series. The sum of a series. Examples of series. Convergence criteria for series. Absolutely convergent series. Fourier series. 3. Integrals in a generalized sense. Practical criteria for determining the nature of improper integrals. 4. Differential calculus of real functions of several real variables. Partial derivatives of the first and second orders. Differential and Taylor's formula for multivariable functions. Applications to extreme local problems. 5. The integral calculation of the real functions of several real variables. The integral on Ω (curve, surface or body) in relation to the measure. Calculus of double and triple integrals. Reduction to iterated integrals. Change of variable in double and triple integral. Curvilinear and surface integrals.	• Interactive exhibition • Debate • Problematization • Lecture Total	28 hours 28 hours

Course Bibliography :

1. Halic G.: Mathematics: II – Functions of a real variable, IPT Publishing House 1981/83.
2. Fihtenholtz G. M.: Course on Differential and Integral Calculus I, II, III, E.T. 1965.
3. Bânzaru T. and others Mathematical Analysis, Problem Collection, IPT Publishing House, 1990.
4. Halic G. Mathematical Analysis, Minimal Set of Problems, UAV Publishing House 1991.
5. Roşculeţ M. Mathematical Analysis I, II, Ed. did. and ped. Bucharest, 1967.
6. Craiu M., Tănase V. Mathematical Analysis , Ed. did. and ped. Bucharest, 1980.
7. Stănăşilă O. Mathematical Analysis , Ed. did. and ped. Bucharest, 1981.
8. Mot, G., Gaga, L., Bulzan, T., Popa, L., Sida, L., Ila, G., Mathematics Superior for Engineers and Economists vol. I, Ed. Viata aradeană, Arad, 2000, 256 p, ISBN: 973–9454–38-4.
9. Mot, G., Gaga, L., Bulzan, T., Popa, L., Sida, L., Ila, G., Mathematics Superior for Engineers and Economists vol. II, Ed. Viata aradeană, Arad, 2000, 270 p, ISBN: 973–9454–37-2.
10. Mot, G., Gaga, L., Bulzan, T., Popa, L., Sida, L., Exercises and problems of higher mathematics for technical and economic profiles, Ed. Viata aradeană, Arad, 2003, 630 p, ISBN: 973–86–288-2-2.

11. Gheorghe ATANASIU, Doina Tofan, Mathematical Analysis, REPROGRAPHY OF THE "TRANSYLVANIA" UNIVERSITY OF BRASOV, 2008.
12. Course in electronic format, 2025.

9.2 Seminar Content	Teaching methods	Observations
1. Polynomial interpolation. Lagrange's interpolation polynomial. Newton's interpolation polynomial. Taylor's formula. Mac Laurin's formula. 2. Number series. The sum of a series. Examples of series. Convergence criteria for series. Absolutely convergent series. Fourier series. 3. Integrals in a generalized sense. Practical criteria for determining the nature of improper integrals. 4. Differential calculus of real functions of several real variables. Partial derivatives of the first and second orders. Differential and Taylor's formula for multivariable functions. Applications to extreme local problems. 5. The integral calculation of the real functions of several real variables. The integral on Ω (curve, surface or body) in relation to the measure. Calculus of double and triple integrals. Reduction to iterated integrals. Change of variable in double and triple integral. Curvilinear and surface integrals.	• Interactive exhibition • Debate • Problematization	14 hours
	• Total	14 hours

Bibliography Seminar:

1. Halic G.: Mathematics: II – Functions of a real variable, IPT Publishing House 1981/83.
2. Fihtenholtz G. M.: Course on Differential and Integral Calculus I, II, III, E.T. 1965.
3. Bânzaru T. and others Mathematical Analysis, Problem Collection, IPT Publishing House, 1990.
4. Halic G. Mathematical Analysis, Minimal Set of Problems, UAV Publishing House 1991.
5. Roşculeţ M. Mathematical Analysis I, II, Ed. did. and ped. Bucharest, 1967.
6. Craiu M., Tănase V. Mathematical Analysis , Ed. did. and ped. Bucharest, 1980.
7. Stănăşilă O. Mathematical Analysis , Ed. did. and ped. Bucharest, 1981.
8. Mot, G., Gaga, L., Bulzan, T., Popa, L., Sida, L., Ila, G., Mathematics Superior for Engineers and Economists vol. I, Ed. Viata aradeană, Arad, 2000, 256 p, ISBN: 973–9454–38-4.
9. Mot, G., Gaga, L., Bulzan, T., Popa, L., Sida, L., Ila, G., Mathematics Superior for Engineers and Economists vol. II, Ed. Viata aradeană, Arad, 2000, 270 p, ISBN: 973–9454–37-2.
10. Mot, G., Gaga, L., Bulzan, T., Popa, L., Sida, L., Exercises and problems of higher mathematics for technical and economic profiles, Ed. Viata aradeană, Arad, 2003, 630 p, ISBN: 973–86–288-2-2.

11. Gheorghe ATANASIU, Doina Tofan, Mathematical Analysis, REPROGRAPHY OF THE "TRANSYLVANIA" UNIVERSITY OF BRASOV, 2008.
12. Seminar in electronic format, 2025.

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The content of the course is in accordance with what is done 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 representatives of the business environment and with teachers of mathematics and computer science from the pre

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1. Course	Correctness and completeness of knowledge. Logical coherence. The degree of assimilation of the specialized language. Criteria regarding attitudinal aspects: conscientiousness, interest in individual study.	Written evaluation (final in the exam session): Active participation in courses.	80 %
11.2. Seminar	Ability to use assimilated knowledge; Ability to apply in practice. Criteria regarding attitudinal aspects: conscientiousness, interest in individual and team study.	Current written works: homework, projects. Final written evaluation (in the exam session) Active participation in seminars.	20%
11.3. Minimum performance standard Knowledge of the fundamental elements of theory, solving simple applications.			

Date of completion	Signature of the course holder	Signature of the seminar instructor
20.09.2026	Senior Lect.dr. Lavinia Sida	Assistant. Drd. Sorin Hoară

Date of approval in the department	Signature of the department director
26.09.2026	Assoc.prof.dr.eng. Valentin Dan Muller

Date of approval in the faculty council	Approval from the Dean
29.09.2026	Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1 Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2 Faculty	FACULTY OF ENGINEERING
1.3 Department	AUTOMATICS, INDUSTRIAL TEXTILE AND TRANSPORT ENGINEERING
1.4 Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5 Study cycle	BACHELOR OF SCIENCE
1.6 Study program/Qualification	AUTOMATICS AND APPLIED COMPUTER SCIENCES (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title	ETHICS AND ACADEMIC INTEGRITY
2.2 Course Lecturer	Assoc.prof.dr. Maria SINACI
2.3 Seminar / Laboratory Instructor	-
2.4 Year of Study	1
2.5 Semester	1
2.6 Type of Assessment	VERIFICATION
2.7 Course Status	DC-compulsory

3. Estimated Total Time (hours per semester of didactic activities)

3.1 Hours per week	1	of wich 3.2 curs	1	3.3 Seminar / Laboratory	0
3.4 Total hours in the study plan	14	of wich 3.5 curs	14	3.6 Seminar / Laboratory	0

Time allocation	hours
Study based on course materials, bibliography	26
Additional documentation in library, specialized databases, or field work	6
Preparation for seminars/labs, essays, portfolios	4
Tutoring	0
Examinations	0
Other activities...	0
3.7 Total hours of individual study	36
3.8 Total hours per semester	50
3.9 Number of credits	2

4. Preconditions (where applicable)

4.1 of curriculum	Not applicable
4.2 of competences	Not applicable

5. Conditions (where applicable)

5.1 of conducting the course	Classroom equipped with a projector and internet access
5.2 of conducting the seminar and laboratory	-

6. Specific Competencies Acquired

Professional Competences	
Transversal Competences	CT2. Complies with regulations

7. Learning Outcomes

Knowledge	Knows the principles of professional ethics and deontology Is familiar with the applicable procedures and quality standards
Skills	Correctly applies regulations, procedures and instructions specific to the activity Proposes solutions to improve compliance with rules and procedures
Responsibility and Autonomy	Respects the principles of professional ethics in all activities carried out. Contributes to promoting an organizational culture based on compliance and integrity Manifesting ethical behavior and a professional attitude in engineering activity.

8. Objectives of the discipline (resulting from the grid of specific competences accumulated)

8.1 General objective of the discipline	The general objective of the course is to strengthen students' academic achievement by promoting a learning environment based on respect, honesty, integrity, and responsibility.
8.2 Specific Objectives	To appropriately acquire the specific concepts of ethics and academic integrity for their application in developing a responsible professional career. To develop skills in identifying and resolving problems with ethical implications (ethical dilemmas). To gain the ability to prepare scientific papers in accordance with the principles of ethics and academic integrity.

9. Course Content

9.1 Course	**Teaching Methods**	**Observations**
1. Introduction. Fundamental Concepts and Distinctions in Ethics and Academic Integrity	Lecture, Heuristic Discussion	2 hours
2. Personal Values, Collective Values. Ethical Principles and Norms	Interactive Lecture, Case Study	2 hours
3. Ethical Dilemmas in the Academic Environment. Guidelines for Ethical Decision-Making	Explanation, Brainstorming, Heuristic Discussion	2 hours
4. Preparing a Scientific Paper: Structure, Citation Systems, and Bibliography	Presentation, Heuristic	2 hours

	Discussion, Case Study	
5. Ethical Issues in Preparing Scientific Papers: Plagiarism, Self-Plagiarism, Data Falsification and Fabrication	Presentation, Debate, Case Study	2 hours
6. Ethical Use of AI in Academic Tasks – Opportunities and Challenges	Explanation, Heuristic Discussion, Case Study	2 hours
7. Codes and Tools for Guiding Behavior in the Academic Environment and Regulating Research Ethics	Interactive Lecture, Case Study	2 hours
	TOTAL	14 hours
Course Bibliography: 1. Chelcea, SHow to write a bachelor's thesis, a doctoral thesis, a scientific article in the field of social sciences and humanities, Comunicare.ro ebook. 2012. 2. Constantinescu, M., Mureșan, V., Institutionalization of ethics - mechanisms and instruments, University of Bucharest Publishing House, Bucharest, 2013. 3. Ioan, B. G., Ethics and academic integrity. Guide to good practices, Gr. T. Popa Publishing House, Iași, 2018. 4. Şercan, E., Academic ethics: practical guide, University of Bucharest Publishing House, Bucharest, 2017. 5. Vătăman, D. Ethics and academic integrity. Course support for undergraduate university studies, Pro Universitaria Publishing House, Bucharest, 2019. 6. Course support, Ethics and academic integrity, electronic format, SUMS platform, UAV Arad, 2025. 7. https://www.eur.nl/https://uk.sagepub.com/sites/default/files/upm-binaries/39590_Chapter7.pdf). en/about-university/policy-and-regulations/integrity/research-integrity/dilemma-game 8. https://cdn.uav.ro/documente/Universitate/Calitate/Regulamente-Metodologii-Proceduri-Formulare/Carte-coduricontracte/CARTAU1-site.pdf .		

9.2 Seminar / Laboratory	**Teaching Methods**	**Observations**
-	-	-
Seminar Bibliography	-	

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The course content has been developed taking into account the need to cultivate a set of knowledge, skills, and attitudes necessary for ethical professional conduct, in alignment with the expectations of employers in the fields of automation and applied computer science.

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1 Course	Appropriate use of ethical concepts, principles, and theories; ethical reasoning and justification of choices; coherence and clarity of responses provided in the course.	Summative assessment type verification: a) the portfolio created by the students; b) the answers provided during the course.	90% 10%
11.2 Seminar/Laboratory	-	-	-
11.3 Minimum Performance Standard Proof of understanding of the terminology and basic methods specific to the discipline. Obtaining a grade of 5 certifies the acquisition of the minimum learning outcomes related to the discipline (5 is the minimum passing grade).			

Date of completion
20.09.2025

Signature of course holder
Assoc.prof.dr. Maria SINACI

Signature of seminar holder

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.Prof. dr.eng. Valentin Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1. Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2. Faculty	FACULTY OF ENGINEERING
1.3. Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4. Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5. Study Cycle	BACHELOR OF SCIENCE
1.6. Study Programme/Qualification	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	ENGLISH LANGUAGE
2.2 Course Lecturer:	
2.3 Seminar/Laboratory Instructor:	Lecturer, PhD: Patricia Anca ȘIPOȘ
2.4 Year of Study:	1
2.5 Semester	1
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DC-optional

3. Estimated Total Time (hours per semester of didactic activities)

3.1. Hours per week	2	of which3.2. lecture	-	3.3. Seminar	2
3.4. Total hours in the study plan	28	of which3.5. lecture	-	3.6. Seminar	28

Time allocation:	**Hours**
Study based on course materials, bibliography	10
Additional documentation in library, specialized databases, or field work	8
Preparation for seminars/labs, essays, portfolios	-
Tutoring	2
Examinations	2
Other activities...	-
3.7 Total hours of individual study	22
3.8 Total hours per semester	50
3.9 Number of credits	2

4. Preconditions (where applicable)

4.1. of curriculum	Previous knowledge of English
4.2. of competences	Fluent communication ability B2

5. Conditions (where applicable)

5.1. Course Course	
5.2. Seminar	Seminar room

6. Specific Competencies Acquired

Professional Competencies	
Transversal Competencies	CT1. Work in teams - Work confidently within a group, each doing their part in the service of the whole. CT2. Comply with regulations - Comply with the rules, regulations and guidelines related to a particular field or sector and apply them in their daily work. CT3. Think analytically – Think using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.

7. Learning Outcomes

Knowledge	Know the principles and stages of teamwork. Know ways to communicate and collaborate effectively. Know the principles of professional ethics and deontology. He is familiar with the applicable procedures and quality standards. It processes information, ideas and concepts. Think creatively and innovatively.
Skills	Actively participates in team activities, contributing to the achievement of common goals. Demonstrates the ability to negotiate and resolve conflicts constructively. Correctly apply activity-specific regulations, procedures, and instructions. Propose solutions to improve compliance with rules and procedures. Think analytically and creatively.
Responsibilities and autonomy	They take on their own tasks and respect the deadlines set in the team. Contribute to a positive and productive team climate. Respects the principles of professional ethics in all activities carried out. It contributes to the promotion of an organizational culture based on compliance and integrity. Approach problems critically.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1. General objective of the discipline	- offering and requesting various information within a conversation - extracting essential information from a text and using it in various activities - the correct use of as many grammatical and language structures as possible - Acquiring the basic specialized language and using it in writing various materials or in various conversational situations
8.2. Specific objectives	- Acquiring the basic specialized language and using it in writing various materials or in various conversational situations

9. Contents

9.1. Course	**Teaching methods**	**Observations**

9.2. Seminar	Seminar methods	Observations
Computer types	-Lecture; - Interactive dialogue;	4 hours
Input devices	-Lecture; - Interactive dialogue;	4 hours
Output devices	-Lecture; - Interactive dialogue;	4 hours
Storage devices	-Lecture; - Interactive dialogue;	4 hours
Motoring, cars	-Lecture; - Interactive dialogue;	2 hours
Computer architecture	-Lecture; - Interactive dialogue;	4 hours
Software and programming languages	-Lecture; - Interactive dialogue;	4 hours
Oral Examination	-Dialogue;	2 hours
	All	28 hours

Seminar bibliography:

[1]. BANTAŞ, ANDREI, Porteanu Rodica, English Language for Science and Technology, Niculescu Publishing House, Bucharest, 1999.

[2]. CHITORAN, DUMITRU, Panoref Irina, Poenaru Ioana, English Grammar Exercices, Ed.Teora, Bucharest, 1999.

[3]. E.ADAM, English for Science and Technology, Cavallioti Publishing House, The British Council, Bucharest, 1999.

[4]. GLENDING, H.ERIC, English in Mechanical Engineering, Teacher's Edition, Oxford University Press, 1990.

[5]. HAPGOOD, MICHAEL, English Lesson One, Heinemann, Educational Books.

[6]. IDEM, English Lesson Three, Heinemann, Educational Books.

[7]. JONSON D and CN, General Engineering, Prentice Hall International, Great Britain, 1993.

[8]. MILLS, MARTIN, Nexus, English for Advanced Learners, Macmillan, UK, 2004.

[9]. PADIOŞ, CONSTANTIN, English Grammar, Therory and Practice, Ed. Polirom, Bucharest, 2001.

[10]. Vince, MICHAEL, Advanced Language Practice, English Grammar and Vocabulary, Macmillan, UK, 2004.

Dictionaries

[11]. NICULESCU, GABRIELA; CINCU, CORNELIU, Romanian-English Technical Dictionary, Bucharest Technical Publishing House, 2001.

[12]. WEBBER, MARTIN, Elementary Technical English, Thomas Nelson, 1983.

[13]. *Seminar in electronic format, uploaded to the SUMS platform, 2025.*

10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The contents of the discipline were developed in accordance with the expectations of employers, with a national program and with the consultation of members of the same specialty within the department and from similar departments from other universities

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1. Course			
11.2. Seminar	- Correct use of specialized language; - Ability to solve the proposed exercises that lead to the recapitulation of various grammar problems and various language structures; - Translations and retroversions in which the learned specialty terms appear	- Periodic testing during the semester (Partial exam) - Answers to the exam / colloquium (final evaluation); - Preparation of reports; - Preparation of portfolios.	- Responses to the final evaluation – 70%; - Testing during the semester – 30%;
11.3. Minimum performance standard			
Writing a written document at B2 level to argue a point of view on a certain topic, coherent and linguistically correct, adapted to the context and field of interest; fluent oral argumentation, correctly articulated, at minimum level B2.			

Date of completion 20.09.2025

Signature of the course holder

Signature of the seminar instructor
Senior lecturer.dr. Anca Șipoș

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.Prof. dr.eng. Valentin Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie

SYLLABUS

1. Program Information

1.1. Higher education institution	AUREL VLAICU UNIVERSITY OF ARAD
1.2. Faculty	FACULTY OF ENGINEERING
1.3. Department	AUTOMATION, INDUSTRIAL ENGINEERING, TEXTILES AND TRANSPORTS
1.4. Field of study	AUTOMATION, APPLIED INFORMATICS AND INTELLIGENT SYSTEMS
1.5. Study Cycle	BACHELOR OF SCIENCE
1.6. Study Programme/Qualification	AUTOMATION AND APPLIED INFORMATICS (IN ENGLISH) (AIA-E)

2. Course Information

2.1 Course Title:	ENGLISH LANGUAGE
2.2 Course Lecturer:	
2.3 Seminar/Laboratory Instructor:	Lecturer, PhD: Patricia Anca ȘIPOȘ
2.4 Year of Study:	1
2.5 Semester	2
2.6 Type of Assessment:	VERIFICATION
2.7 Course Status:	DC-optional

3. Estimated Total Time (hours per semester of didactic activities)

3.1. Hours per week	2	of which3.2. lecture	-	3.3. Seminar	2
3.4. Total hours in the study plan	28	of which3.5. lecture	-	3.6. Seminar	28

Time allocation:	**Hours**
Study based on course materials, bibliography	10
Additional documentation in library, specialized databases, or field work	8
Preparation for seminars/labs, essays, portfolios	-
Tutoring	2
Examinations	2
Other activities...	-
3.7 Total hours of individual study	22
3.8 Total hours per semester	50
3.9 Number of credits	2

4. Preconditions (where applicable)

4.1. of curriculum	Previous knowledge of English
4.2. of competences	Fluent communication ability B2

5. Conditions (where applicable)

5.1. Course Course	
5.2. Seminar	Seminar room

6. Specific Competencies Acquired

Professional Competencies	
Transversal Competencies	CT1. Work in teams - Work confidently within a group, each doing their part in the service of the whole. CT2. Comply with regulations - Comply with the rules, regulations and guidelines related to a particular field or sector and apply them in their daily work. CT3. Think analytically – Think using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.

7. Learning Outcomes

Knowledge	Know the principles and stages of teamwork. Know ways to communicate and collaborate effectively. Know the principles of professional ethics and deontology. He is familiar with the applicable procedures and quality standards. It processes information, ideas and concepts. Think creatively and innovatively.
Skills	Actively participates in team activities, contributing to the achievement of common goals. Demonstrates the ability to negotiate and resolve conflicts constructively. Correctly apply activity-specific regulations, procedures, and instructions. Propose solutions to improve compliance with rules and procedures. Think analytically and creatively.
Responsibilities and autonomy	They take on their own tasks and respect the deadlines set in the team. Contribute to a positive and productive team climate. Respects the principles of professional ethics in all activities carried out. It contributes to the promotion of an organizational culture based on compliance and integrity. Approach problems critically.

8. Objectives of the discipline (resulting from the grid of specific competences acquired)

8.1. General objective of the discipline	- offering and requesting various information within a conversation - extracting essential information from a text and using it in various activities - the correct use of as many grammatical and language structures as possible - Acquiring the basic specialized language and using it in writing various materials or in various conversational situations
8.2. Specific objectives	- Acquiring the basic specialized language and using it in writing various materials or in various conversational situations

9. Contents

9.1. Course	**Teaching methods**	**Observations**

9.2. Seminar	Seminar methods	Observations
Computer types	-Lecture; - Interactive dialogue;	4 hours
Input devices	-Lecture; - Interactive dialogue;	4 hours
Output devices	-Lecture; - Interactive dialogue;	4 hours
Storage devices	-Lecture; - Interactive dialogue;	4 hours
Motoring, cars	-Lecture; - Interactive dialogue;	2 hours
Computer architecture	-Lecture; - Interactive dialogue;	4 hours
Software and programming languages	-Lecture; - Interactive dialogue;	4 hours
Oral Examination	-Dialogue;	2 hours
	All	28 hours

Seminar bibliography:

[1]. BANTAŞ, ANDREI, Porteanu Rodica, English Language for Science and Technology, Niculescu Publishing House, Bucharest, 1999.

[2]. CHITORAN, DUMITRU, Panoref Irina, Poenaru Ioana, English Grammar Exercices, Ed.Teora, Bucharest, 1999.

[3]. E.ADAM, English for Science and Technology, Cavallioti Publishing House, The British Council, Bucharest, 1999.

[4]. GLENDING, H.ERIC, English in Mechanical Engineering, Teacher's Edition, Oxford University Press, 1990.

[5]. HAPGOOD, MICHAEL, English Lesson One, Heinemann, Educational Books.

[6]. IDEM, English Lesson Three, Heinemann, Educational Books.

[7]. JONSON D and CN, General Engineering, Prentice Hall International, Great Britain, 1993.

[8]. MILLS, MARTIN, Nexus, English for Advanced Learners, Macmillan, UK, 2004.

[9]. PADIOŞ, CONSTANTIN, English Grammar, Therory and Practice, Ed. Polirom, Bucharest, 2001.

[10]. Vince, MICHAEL, Advanced Language Practice, English Grammar and Vocabulary, Macmillan, UK, 2004.

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[11]. NICULESCU, GABRIELA; CINCU, CORNELIU, Romanian-English Technical Dictionary, Bucharest Technical Publishing House, 2001.

[12]. WEBBER, MARTIN, Elementary Technical English, Thomas Nelson, 1983.

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10. Corroboration/validation of the course content with the expectations of representatives of the epistemic community, professional associations, and representative employers in the field related to the program

The contents of the discipline were developed in accordance with the expectations of employers, with a national program and with the consultation of members of the same specialty within the department and from similar departments from other universities

11. Assessment

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final grade
11.1. Course			
11.2. Seminar	- Correct use of specialized language; - Ability to solve the proposed exercises that lead to the recapitulation of various grammar problems and various language structures; - Translations and retroversions in which the learned specialty terms appear	- Periodic testing during the semester (Partial exam) - Answers to the exam / colloquium (final evaluation); - Preparation of reports; - Preparation of portfolios.	- Responses to the final evaluation – 70%; - Testing during the semester – 30%;
11.3. Minimum performance standard			
Writing a written document at B2 level to argue a point of view on a certain topic, coherent and linguistically correct, adapted to the context and field of interest; fluent oral argumentation, correctly articulated, at minimum level B2.			

Date of completion 20.09.2025

Signature of the course holder

Signature of the seminar instructor
Senior lecturer.dr. Anca Șipoș

Date of approval in the department
26.09.2025

Signature of the department director
Assoc.Prof. dr.eng. Valentin Muller

Date of approval in the faculty council
29.09.2026

Approval from the Dean
Senior lecturer.dr.eng. Corina-Anca Mnerie