

DISCIPLINE SHEET

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University of Cluj-Napoca
1.2 Faculty	Environmental Science and Engineering
1.3 Department	Environmental Analysis and Assessment
1.4 Field of study	Environmental Engineering
1.5 Cycle of studies	Bachelor
1.6 Study Programme/Qualification	Environmental Engineering

2. Information regarding the discipline

2.1 Name of the discipline	Computer aided graphics						
2.2 Course coordinator	Assistant Prof., PhD Manciuła Dorin						
2.3 Seminar coordinator	Assistant Prof., PhD Manciuła Dorin						
2.4 Year of study	I	2.5 Semester	2	2.6. Type of evaluation	E	2.7 Type of discipline	Compulsory

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

3.1 Hours per week	4	Of which: 3.2 Course	2	3.3 Seminar / laboratory	2
3.4 Total hours in the curriculum	56	Of which: 3.5 Course	28	3.6 Seminar / laboratory	28
Time allotment:					Hours
Learning using manual, course support, bibliography, course notes					12
Additional documentation (in libraries, on electronic platforms, field documentation)					12
Preparation for seminars/labs, homework, papers, portfolios and essays					12
Tutorship					2
Evaluations					2
Other activities: visits, workshops, and other academic activities					2
3.7 Total individual study hours	42				
3.8 Total hours per semester	98				
3.9 Number of ECTS credits	4				

4. Prerequisites (if necessary)

4.1 Curriculum	applied mathematics in environmental engineering and geometry.
4.2 Competences	basic notions of drawing and engineering, information and documentation, teamwork, use of computer technologies for acquisition and processing of graphic data.

5. Conditions (if necessary)

5.1. For the course	Necessity of digital (video) projector and a computer / laptop, teaching space (50 - 60 seats).
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5.2 For the seminar / lab activities	Teaching laboratory / room A.1.6, equipped with computers and specific programs (software).
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6. Specific competencies acquired

Professional competencies	- developing teamwork skills, relational thinking and finding concrete ways to approach and solve graphic problems; - critical analysis, application of models, theories and the use of notions in the field of fundamental sciences and engineering to address the specific problems of environmental knowledge and protection; - explaining and interpreting specific properties, concepts, approaches, models and notions related to technical drawing in relation to fundamental and engineering sciences; - presentation of drawings, sketches and projects related to engineering fields; - recognition and description of concepts, theories, methods and elementary graphic models applicable to engineering sciences.
Transversal competencies	- identifying and complying with the norms of ethics and professional deontology, assuming responsibilities for the decisions taken and the related risks; - identifying roles and responsibilities in a multidisciplinary team and applying techniques for relationships and effective work within the team; - efficient use of information sources and resources for communication and assisted professional training (portals, Internet, specialized software applications, databases, online courses, etc.) both in Romanian and in an international language; - description, analysis and use of concepts and theories in the fundamental scientific fields (mathematics, physics) and in the field of engineering sciences.

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

7.1 General objective of the discipline	- acquisition of theoretical knowledge regarding theoretical principles, general notions and norms of technical graphics for the engineer in the process industries; - introduction of the basic elements of computer-aided graphics necessary for the preparation of graphic documentation of a technological nature and/or for machinery and installations.
7.2 Specific objectives of the discipline	- developing technical skills in order to make scale graphic representations; - application of concepts related to the working techniques used in descriptive geometry and technical graphics.

8. Content

8.1 Course	Teaching methods	Remarks
Course 1. Introductory notions. Descriptive geometry elements. Information provided by the technical drawing. Notations and symbols. Standardization and the role of standards in technical drawing.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 2. Classification of technical drawings. Modes of representation in technique. Orthogonal projections. Representation in perspective. Spatial modeling. Reference systems. Projection systems. The central conical system. The parallel-cylindrical system.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 3. The point. Representation of the point. The point and the projection of the point. Point projection in the dihedral system and in the trihedral system. Points	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional

located in bisector planes, on the intersection line between two planes, and in projection planes.		
Course 4. The line and the projection of the line. General elements and principles of line projection. The particular positions of the lines in relation to the projection planes. The relative positions of two lines.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 5. The plan and the projection of the plan. Determination and representation of the plan. Particular lines contained in the plan. The particular positions of a plane in relation to the projection planes.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 6. The relative position of two planes. The relative positions of a line to a plane. The intersection of the lines, the intersection of the line with the plane, the intersection of the planes.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 7. Methods of descriptive geometry. The method of changing the projection planes. The rotation method and the folding method.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 8. The representation of geometrical bodies. Representation of polyhedra. Representation of the prism. Representation of the pyramid. Representation of rotational solids. Representation of the cone, cylinder and sphere.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 9. Planar sections in geometric bodies. Planar sections in polyhedra. Planar section in prism. The flat section in the pyramid. Planar sections in rotational solids. Flat section in rotational solids bordered by ruled surfaces and non-ruled surfaces. Flat section in the cylinder.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 10. Axonometric representation. The axonometric plane of representation. Reduction coefficients. Classification of orthogonal axonometric representations. Representations of plane figures in the orthogonal axonometric system.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 11. Technical graphics. General rules for technical representations. Lines used in technical representations. Standardized writing. Standardized formats. Industrial drawings indicator. Numerical scales. Quotation of technical drawings. Graphic execution and arrangement of dimension elements. Rating systems. Dimensioning systems. Hatching. Tolerances.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 12. Representation and notation of views, sections and breaks in technical drawing. General rules for the representation of views. Classification of views. General rules for the representation of sections. The sectioning route. Classification of sections. General rules for the representation of ruptures. Common rules for representing views, sections, and breaks.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Course 13. Preparation of technical drawings. Rules and principles for making simple technical drawings. Rules, principles and methods for making the assembly drawings. Dismountable and non-dismountable assemblies.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional

Course 14. Specific and conventional representations. Representation and dimensioning of gears. Bearing representation and dimensioning.	Interactive exposure, explanation, conversation, didactical demonstration.	Attending the course is optional
Bibliography - Grafică asistată de calculator - Suport de curs; - Moncea J. - Geometrie descriptivă și desen tehnic, Vol. I, Editura Didactică și Pedagogică, București, 1982; - Enache T. Ivăncescu V. - Geometrie descriptivă și desen tehnic, Editura Didactică și Pedagogică, București, 1982; - Vasilescu E. - Desen tehnic industrial, Editura Tehnică, București, 1994; - Crișan N. - Noțiuni Fundamentale în Desenul Tehnic Industrial, Vol. I, Editura Risoprint, Cluj-Napoca, 2001; - Dolga L., Dănilă M., Revencu M. - Desen tehnic pentru electrotehnică, Editura Politehnica, Timișoara, 2002; - Popescu T. V. - Geometrie descriptivă, Editura Universitaria, Craiova, 2004; - Macarie F., Olaru I. - Desen tehnic, Editura Alma Mater, Bacău, 2007; - Anghel C., Șimon G. - Grafică tehnică asistată de calculator, Editura Risoprint, Cluj-Napoca, 2008; - Kiraly A - Geometrie descriptivă și desen tehnic, Editura Mega, Cluj-Napoca, 2016.		
8.2 Seminar / laboratory	Teaching methods	Remarks
L.P 1. Overview and explanation of the basics used to make technical drawings and those related to computer-aided graphics.	Conversation, exercises, exemplification, case studies	Attendance at the practical work is mandatory
L.P 2. Making drawings on the drawing board with drawing tools. Plan and projection representations on projection planes.	Drawing, exercises and graphic problems, exemplification	Attendance at the practical work is mandatory
L.P 3. Making drawings on the drawing board with drawing tools. Representations in unfolded planes. Execution of scale drawings.	Drawing, exercises and graphic problems, exemplification	Attendance at the practical work is mandatory
L.P.4. Making drawings on the drawing board with drawing tools. Representation of geometric bodies in section. Hashes.	Drawing, exercises and graphic problems, exemplification	Attendance at the practical work is mandatory
L.P 5. Elements of 2D computer graphics. Computer graphics system. Overview of the graphic programs and work steps.	Conversation, exercises, exemplification, case studies	Attendance at the practical work is mandatory
L.P 6. 2D computer graphics elements. Presentation of the user interface, the component modules within the graphic system and the configuration of the menu. Multi-document operation. Presentation of options and controls.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 7. 2D computer graphics elements. Making sketches and profiles.	Practical use of graphics programs	Attendance at the practical work is mandatory

L.P 8. 3D computer graphics elements. Presentation and configuration of the menu. Presentation of the graphical interface. Presentation of the component modules within the graphic system. Operating with documents. Presentation of options and controls.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 9. 2D and 3D computer graphics drawing sketches and profiles. Making constructions and 3D models. Solving viewing problems. Dimensioning of drawings.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 10. 2D and 3D computer graphics elements. Making drawings with the help of the graphic system according to examples. Representation of geometric bodies and parts. The overall drawing.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 11. Computer graphics elements. Use of the EON-XR online platform. Getting Started. Options for viewing models (3D, AR, VR). Overview of the program. Presentation of the menu, options and controls.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 12. Computer graphics elements. Use of the EON-XR online platform. Making a 3D presentation according to a given topic / theme. Assembling and disassembling the 3D model into component elements. Description of the component elements and addition of information.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 13. Computer graphics elements. Use of the EON-XR online platform. Making questionnaires and introducing 3D models, descriptive information sets and text, audio and video references.	Practical use of graphics programs	Attendance at the practical work is mandatory
L.P 14. Laboratory colloquium.	Examination	Attendance at the laboratory colloquium is mandatory Solving the assignment requires the use of the computer with the related graphic programs
Bibliography • Luis V., Racoccea C., Borş M., Ignat C., Segal L. - Reprezentări axonometrice în desenul industrial, Editura Tehnica, Chişinău, 1995; • Orban M., Florea C. Noveanu L., Florea S., Ghiolţean L. M., Budişan T.,- Geometrie descriptivă. Suprafeţe şi corpuri cu aplicaţii în tehnică, Editura UDPres, Cluj-Napoca, 2002; • Popescu T. V., Geometrie descriptivă, Editura Universitaria, Craiova, 2004; • Anghel C., Şimon G. - Grafică tehnică asistată de calculator, Editura Risoprint, Cluj-Napoca, 2008; • Rose-Marie de Premont – Desenul. Ghid practic, Editura Teora, 2013; • Drăgoi C. – Metodica rezolvării problemelor de construcţii geometrice cu rigla şi compasul, Editura Presa Universitară Clujeană, Cluj-Napoca, 2018.		

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

• The course and practical work present examples of calculation, case studies, problems, exercises and examples in order to familiarize students with the general elements of technical graphics, working methods and tools used to make drawings with the help of drawing tools and through computer-aided graphics programs (software).

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Theoretical knowledge acquired	Written exam.	60 %
10.5 Seminar / lab activities	12 practical works (of which 3 works made with drawing tools and 9 works made with the help of graphic programs / software) 1 seminar 1 laboratory colloquium	Colloquium Examination requires solving computer graphics problems	40 %
10.6 Minimum performance standard			
• participation in at least 80 % of the practical laboratory work (10 practical works out of 12) and presentation at the end of the class of drawings made on drawing boards and those made with the aid of graphic programs and computer; • submission of individual assignments on time; • obtaining a grade of 5 in the laboratory colloquium and a grade of 5 in the exam.			

Date

Signature of the
course coordinator

Signature of the
seminar coordinator

04.12.2024



Date of approval

Signature of the head of department

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