SYLLABUS

1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty[1]/ Department [2]	Chemical Engineering, Biotechnologies and Environmental Protection / Mechatronics
1.3 Field of study (name/code[3])	Chemical Engineering / 10.30.50
1.4 Study cycle	License
1.5 Study program (name/code/qualification)	Chemical Engineering / 10.30.50.60 / engineer

2. Information about the discipline

2.1 Name of discipline/ formative category[4]			Computer Assisted Graphics / DF				
2.2 Coordinator (holder) of course activities			Ș.L.dr.ing. Hannelore FILIPESCU				
2.3 Coordinator (holder) of applied activities[5]			Ș.L.dr.ing. Hannelore FILIPESCU				
2.4 Year of study[6]	I	**2.5** Semester	2	**2.6** Type of evaluation	D	**2.7** Regime of discipline[7]	DI

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [8]

3.1 Number of fully assisted hours / week	3 of which:	**3.2** course	1	**3.3** seminar / laboratory / project	0/2/0
3.1* Total number of fully assisted hours / semester	42 of which:	**3.2*** course	14	**3.3*** seminar / laboratory / project	0/28/0
3.4 Number of hours partially assisted / week	of which:	**3.5** training		**3.6** hours for diploma project elaboration	
3.4* Total number of hours partially assisted / semester	of which:	**3.5*** training		**3.6*** hours for diploma project elaboration	
3.7 Number of hours of unassisted activities / week	4.14 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			1
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			2.14
3.7* Number of hours of unassisted activities / semester	58 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			14
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			30
3.8 Total hours / week [9]	7.14				
3.8* Total hours /semester	100				
3.9 Number of credits	4				

4. **Prerequisites** (where applicable)

4.1 Curriculum	• Mathematics, Physics, Chemistry
4.2 Competencies	• Plane and space geometry, Trigonometry, Computer skills and

[1] The name of the faculty which manages the educational curriculum to which the discipline belongs
[2] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.
[3] The code provided in HG - on the approval of the Nomenclature of fields and specializations / study programs, annually updated.
[4] Discipline falls under the educational curriculum in one of the following formative disciplines: Basic Discipline (DF), Domain Discipline (DD), Specialist Discipline (DS) or Complementary Discipline (DC).
[5] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[6] Year of studies in which the discipline is provided in the curriculum.
[7] Discipline may have one of the following regimes: imposed discipline (DI) or compulsory discipline (DOb)-for the other fundamental fields of studies offered by UPT, optional discipline (DO) or optional discipline (Df).
[8] The number of hours in the headings 3.1 *, 3.2 *, ..., 3.8 * is obtained by multiplying by 14 (weeks) the number of hours in headings 3.1, 3.2, ..., 3.8. The information in sections 3.1, 3.4 and 3.7 is the verification keys used by ARACIS as: (3.1) + (3.4) ≥ 28 hours / wk. and (3.8) ≤ 40 hours / wk.
[9] The total number of hours / week is obtained by summing up the number of hours in points 3.1, 3.4 and 3.7.

	competences

5. Conditions (where applicable)

5.1 of the course	• Classroom equipped with video projector, video projection screen and blackboard.
5.2 to conduct practical activities	• Classroom equipped with individual computers, video projector, video projection screen and blackboard. The computers have the specific software installed and electronic format for theory.

6. Specific competencies acquired through this discipline

Specific competencies	• Familiarization with the software work environment used in computer-aided design procedures. • Learning of general design outlines. • Creative and innovative use of basic knowledge in 3D modeling. • Solving the problems of: dimension, operation and maintenance issues. • To create the ability to use the knowledge gained to solve the problems.
Professional competencies ascribed to the specific competencies	• - Analyse production processes for improvement; • - Manage chemical testing procedures; • - Test materials; • - Write technical reports • -Performs chemical experiments • -Approve engineering design • -Assess environmental impact

Transversal competencies ascribed to the specific competencies

- - Conduct quality control;
- - Apply scientific, technological and engineering knowledge;
- - Uses equipment, instruments or technological equipment accurately.

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7. Objectives of the discipline (based on the grid of specific competencies acquired - pct.6)

7.1 The general objective of the discipline	• Knowledge and applying the types of representation for objects, the procedures for developing graphic documentation for industrial products, as well as the use of computer graphic environments specific to the engineering field. •
7.2 Specific objectives	• **Knowledge:** • Knowledge and application of graphic representation techniques in engineering, shape representation and schematic representations in the engineering field. • **Habilitation:** • Acquiring the ability to create the graphics engineering models of low and medium complexity using computer aided design and appropriate software environments. • **Attitudinal and performance**: • Developing the ability to operate mentally, at an abstract level, with geometric shapes specific of engineering products. Developing the ability to justify the graphic representations made, the choice the types of shape models and the techniques of implementation. •

8. Content [10]

8.1 Course	Number of hours	Teaching methods [11]
1. Representation types and current techniques of representation in graphics engineering: Shape representation, schematic representations; two-dimensional and three-dimensional representations. Patterns for geometric shapes. 3D and 2D models.	2	Interactive teaching, e-learning PowerPoint presentations, files uploaded to the UPT-Virtual Campus platform; Classic teaching methods combined with modern ones.
2. Creating 3D models for parts: Geometric and engineering principles - Parametric and feature-based, Sketching and constraining techniques, Generating 3D shapes based on sketches, Applying shape finishing elements. Realization of complex forms - "pattern" type. Use of aids and references elements.	6	
3. 2D Representations. Generative techniques and interactive techniques. Conventions and standards of 2D representation in engineering (lines, formats, scales, layout of projections, representation of section, presentation of dimensions, notations, details etc.	4	
4. Assembly design. Components and structure of an assembly. Constraints between components. Shape elements applied to assemblies. Generating component tables. Two-dimensional representations of the geometric shape of the assemblies. Conventions and standards of 2D representation in engineering.	2	

Bibliography [12]

1. L. Dolga ș. a., „Parametric and feature-based modelling with applications in CATIA and Inventor” (în lb. engl.), Ed. Politehnica, Timișoara, 2004, ISBN 973-625-119-5
2. H. Filipescu, „Modelare CAD în ingineria mecanică”, ISBN 978-606-35-0122-7, Ed. Politehnica, Timișoara, 2017
3. E. Zăbavă, „Proiectare tehnică asistată de calculator”, Ed. Politehnica, Timișoara, 2016
4. I. Ghionea, „Proiectare asistata in CATIA v5. Elemente teoretice şi aplicații”, ISBN 978-973-648-654-8, Ed. Bren, Bucureşti, 2007

8.2 Applied activities [13]	Number of hours	Teaching methods
Laboratory works structured as follows:	28	Computer-assisted training based on specific laboratory electronic support.
1. Knowledge of the graphical environment in CATIA. Presentation of the work interface and tools specific to interactive graphics.	2	
2. Interactive creation of the principal 2D graphic elements: line, line types, profile, predefined profiles, etc. Use of created graphics.	4	
3. Registration of dimensions and notations on 2D representations – interactive mode.	4	
4. Parametric modeling of simple models parts.	4	
5. Parametric modeling of medium complexity models parts.	6	
6. Generation of 2D representations for parts: views, sections, details, virtual formats.	4	

[10] It details all the didactic activities foreseen in the curriculum (lectures and seminar themes, the list of laboratory works, the content of the stages of project preparation, the theme of each practice stage). The titles of the laboratory work carried out on the stands shall be accompanied by the notation "(*)".
[11] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).
[12] At least one title must belong to the discipline team and at least one title should refer to a reference work for discipline, national and international circulation, existing in the UPT library.
[13] Types of application activities are those specified in footnote 5. If the discipline contains several types of applicative activities then they are sequentially in the lines of the table below. The type of activity will be in a distinct line as: "Seminar:", "Laboratory:", "Project:" and / or "Practice/training".

7. Test	1	
8. Presentation of portfolio for 3D models and 2D representations.	1	

Bibliography [14]

1. H. Filipescu, „Modelare CAD în ingineria mecanică”, ISBN 978-606-35-0122-7, Ed. Politehnica, Timișoara, 2017
2. E. Zăbavă, „Proiectare tehnică asistată de calculator”, Ed. Politehnica, Timișoara, 2016

9. Corroboration of the content of the discipline with the expectations of the main representatives of the epistemic community, professional associations and employers in the field afferent to the program

- Graphical representations are the language of communication between engineers at an international level, independent of space and time.
- The absence of the skills to understand, interpret and create graphic representations, knowledge and correct application of the conventions specific to the engineering field is a basic condition for engineers in all fields: production, design, maintenance, service, services. The modern engineer must possess knowledge and skills both in the representation of geometric shapes of squares and assemblies. The use of appropriate software environments for the creation of graphic representations of the geometric shape is mandatory for today's engineer, but also for the one over 4 years old, for the rapid integration in the jobs market.

10. Evaluation

Type of activity	**10.1** Evaluation criteria [15]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	The minimal standards refer to the average knowledge of the ways of representing simple objects of the part/assembly type, knowledge of the basic elements for the elaboration of graphic documentation, knowledge of the basic tools for the computerized representation of parts and assemblies, for the generation/creation of 2D representations and for making schematic representations from the engineering field.	Examination mode: written, form of subjects: theoretical and applied.	0.5
10.5 Applied activities	**S:**		
	L: The correct representation of the given models, based on revolution shapes and/or extruded shapes, made in the specific software. Knowledge of the basics of the relevant chapter through testing. The individual creation of a portfolio of works that includes the pieces made during the semester	Practical tests made on the computer from part models (3D and 2D). Evaluation of the individual electronic portfolio of the works carried out in the laboratory during the semester.	0.5
	P[16]**:**		
	Pr:		

[14] At least one title must belong to the discipline team.
[15] Syllabus must contain the procedure for assessing the discipline, specifying the criteria, methods and forms of assessment, as well as specifying the weightings assigned to them in the final grade. The evaluation criteria shall be formulated separately for each activity foreseen in the curriculum (course, seminar, laboratory, project). They will also refer to the forms of verification (homework, papers, etc.)
[16] In the case where the project is not a distinct discipline, this section also specifies how the outcome of the project evaluation makes the admission of the student conditional on the final assessment within the discipline.

10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [17])
• Learning and application of 3D and 2D methods representation for simple parts in computerized profile environments. • Identification of simple elements of conventional representation from specific technical drawing standards.

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
Head of Department (signature)	**Date of approval in the Faculty Council [18]**	**Dean (signature)**
Prof.univ. dr.ing. Erwin Christian LOVASZ		Ș.L.dr.ing. Mircea Laurențiu DAN

[17] It will not explain how the promotion mark is awarded.
[18] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.