SYLLABUS

1. Information about the program

1.1 Higher education institution	UNIVERSITY POLITEHNICA OF TIMISOARA
1.2 Faculty[1]/ Department [2]	ELECTRONICS, TELECOMUNICATON AND INFORMATION TECHNOLOGIES/Mechatronics
1.3 Field of study (name/code[3])	ELECTRONIC ENGINEERING, TELECOMUNICATION AND INFORMATION TECHNOLOGIES
1.4 Study cycle	License
1.5 Study program (name/code/qualification)	TST-ENG/20/20/10/100/10/TST-ENG

2. Information about the discipline

2.1 Name of discipline/ formative category[4]			Computer Aided Graphics/DF				
2.2 Coordinator (holder) of course activities			Dr. Adrian George RADU				
2.3 Coordinator (holder) of applied activities[5]			Dr. Adrian George RADU				
2.4 Year of study[6]	1	**2.5** Semester	1	**2.6** Type of evaluation	E	**2.7** Regime of discipline[7]	DOb

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	2	**3.3** seminar / laboratory / project	0/1/0
3.1* Total number of fully assisted hours / semester	42 of which:	**3.2*** course	28	**3.3*** seminar / laboratory / project	0/14/0
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	2.35 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			0.35
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	33 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			5
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week [9]	5.35				
3.8* Total hours /semester	75				
3.9 Number of credits	3				

4. Prerequisites (where applicable)

4.1 Curriculum	•

[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.

4.2 Competencies	•

5. Conditions (where applicable)

5.1 of the course	• projector
5.2 to conduct practical activities	• 15 CAD workstation with CATIA Licences

6. Specific competencies acquired through this discipline

Specific competencies	• Develop the ability to make free-hand sketching of objects, to read and prepare engineering drawings according to ISO specifications, to imagine, to analyze and communicate with other engineers, and to understand other engineering subjects. • Develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering. • Acquire the ability to visualize physical configurations in terms of real materials, actual constraints, and the practical limitations which govern the behavior of machines and structures. • Get a glimpse on mechanical engineering manufacturing technologies and their implications in design.
Professional competencies ascribed to the specific competencies	• Use of fundamentals in terms of devices, circuits, systems, instrumentation and electronics technology.. • Application of knowledge, concepts and basic methods related to computer system architecture, microprocessors, microcontrolers, programming languages and techniques. • Solving technological problems in field of applied electronics.
Transversal competencies ascribed to the specific competencies	• Methodical analysis of field-related problems aimed at identifying acknowledged solutions, thus ensuring the accomplishment of professional tasks. • Definition of activity stages and their distribution to subordinates in terms of responsibilities, providing exchange of information and interpersonal communication. • Adaptation to new technologies, professional and personal development through continuous training, using printed documentation sources, specialized software and electronic resources in Romanian and at least one foreign language..

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

7.1 The general objective of the discipline	• The main objective of the course is to familiarize the student with various mechanical design concepts and with the available tools used in accomplishing design tasks.
7.2 Specific objectives	• Fundamental concepts in design are presented i.e. force, couple, deformation, displacement, velocity, acceleration, stress and strain. • Material characterization and behavior under load. • Concepts like conservative and non-conservative mechanical systems are introduced via basic definitions for mechanical work, potential and kinetic energy, strain energy, loss of energy through friction resulting in heat generation. • Energy conservation principles and mechanical efficiency concept are presented. • Basic mechanical technology, mechanisms, machine design concepts are presented. • Basic technical drawing principles are stated.

8. Content [10]

8.1 Course	Number of hours	Teaching methods [11]
Coordinate systems and position vectors	1	White Board demonstrations, PowerPoint presentations, pdf documentation,
Kinematics of a particle in plane motion	2	
Kinetics of a particle in plane motion	3	

[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.).

Force systems and equilibrium	2	available video presentations
Kinematics of a rigid body in plane motion	2	
Kinetics of a rigid body in plane motion	2	
Energy conservation principles	2	
Momentum and impulse	2	
Friction, Vibration	3	
Application of equilibrium principles to cables, bars & beams, plates	3	
Mechanics of materials, Mechanical failure	2	
Mechanisms and machine design elements	2	
Basics of technical drawing	2	

Bibliography [12] 1. J.L. Meriam, L.G. Kraige, Engineering Mechanics – Statics & Dynamics, 7th Edition, John Wiley & Sons, 2012
2. R. Budynas and K. Nisbett, Shigley's Mechanical Engineering Design, 9th Edition, McGraw−Hill, 2011
3. D.S. Steinberg, Vibration analysis for electronic equipment, 3rd Edition, John Wiley & Sons, 2000
4. R. Remsburg, Thermal design of electronic equipment, CRC Press, 2001
5. C.H. Simmons, D.E. Maguire, Manual of Engineering Drawing, 2nd Edition, Elsevier, 2004
6. J.J. Uicker Jr, G.R. Pennock, J.E. Shigley, Theory of Machines and Mechanisms, 5th Edition, Oxford University Press 2017
7. A.G. Radu, Dynamic Stability of Composite Laminates, VDM Publishing, 2009

8.2 Applied activities [13]	Number of hours	Teaching methods
Technical drawing basics, orthogonal projections, lines, dimensions, ISO standards	2	Online technical documentation and training materials, ISO standards, technical drawings, hands-on training in CATIA
Mechanisms and Machine elements	2	
Material failure	2	
CATIA – Sketch, dimensions, constraints	2	
CATIA – Solid creation (sweep, extrude, revolve, etc.)	2	
CATIA – 3D assembly,	2	
CATIA – 2D drawings		

Bibliography [14] 1. C.H. Simmons, D.E. Maguire, Manual of Engineering Drawing, 2nd Edition, Elsevier, 2004
2. www.iso.org
3. https://www.catia.ro/?page_id=4812
4. https://www.catia.ro/?page_id=3900
5. https://www.catia.ro/?page_id=3913
6. https://www.catia.ro/?page_id=3919
7. https://www.catia.ro/?page_id=3921
8. https://www.catia.ro/?page_id=3923

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

- As a professional I am quite connected to the expectations of the community as I am also employed by Continental Automotive Timisoara where I am a Level 2 World Wide Expert in Finite Element Analysis. In the past I have been employed also by Solectron Timisoara as an Electronic Assembly Failure Analyst, by Arizona State University as a Post-Doctoral researcher, by Phoenix Analysis and Design Technologies, Arizona, U.S.A. as an engineering intern, and by "Française de Mécanique", Douvrin, France, as a former tempus intern. I am constantly using real life examples in my classes.

10. Evaluation

[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".
[14] At least one title must belong to the discipline team.

Type of activity	**10.1** Evaluation criteria [15]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Written Exam	Two theoretical questions (half-hour) and three problems (one and a half hour)	0.66
10.5 Applied activities	**S:**		
	L: Design tasks in CATIA	Permanent evaluation	0.34
	P[16]**:**		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [17])			
• Passing grade (5) for each exam subject and class participation in both activities			

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
04.07.2023		
Head of Department (signature)	**Date of approval in the Faculty Council** [18]	**Dean (signature)**
	14.09.2023	

[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.

[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.