SYLLABUS [1]

THIS COURSE UNIT IS TAUGHT IN ROMANIAN LANGUAGE

1. Information about the program

1.1 Higher education institution	"POLITEHNICA" UNIVERSITY FROM TIMISOARA
1.2 Faculty[2]/ Department [3]	Faculty of Industrial Chemistry and Environmental Engineering, / CAICAM
1.3 Chair	—
1.4 Field of study (name/code[4])	Chemical Engineering/ DL-50
1.5 Study cycle	Bachelor's Degree
1.6 Study program (name/code/qualification)	IEICM (chimie)/

2. Information about the discipline

2.1 Name of discipline/ formative category[5]			Physical-chemistry				
2.2 Coordinator (holder) of course activities			Associate Professor Dr. Eng. Lavinia LUPA				
2.3 Coordinator (holder) of applied activities[6]			Associate Professor Dr. Eng. Lavinia LUPA				
2.4 Year of study[7]	3	**2.5** Semester	5	**2.6** Type of evaluation	E	**2.7** Type of discipline[8]	

3. Total estimated time – hours / semester: direct teaching activities (fully assisted or partly assisted) and individual training activities (unassisted) [9]

3.1 Number of fully assisted hours / week	4 of which:	**3.2** course	2	**3.3** seminar / laboratory / project	2
3.1* Total number of fully assisted hours / semester	56 of which:	**3.2*** course	28	**3.3*** seminar / laboratory / project	28
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 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			0.5
		hours of individual study after manual, course support, bibliography and notes			1
		training seminars / laboratories, homework and papers, portfolios and essays			0.5
3.7* Number of hours of unassisted activities / semester	28 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			7
		hours of individual study after manual, course support, bibliography and notes			14
		training seminars / laboratories, homework and papers, portfolios and essays			7
3.8 Total hours / week [10]	6				
3.8* Total hours /semester	84				
3.9 Number of credits	4				

4. Prerequisites (where applicable)

4.1 Curriculum	• General Chemistry, Matematics

[1] The form corresponds to the Discipline File promoted by OMECTS 5703 / 18.12.2011 and to the requirements of the ARACIS Specific Standards valid from 01.10.2017.
[2] The name of the faculty which manages the educational curriculum to which the discipline belongs
[3] The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.
[4] The code provided in HG no.140 / 16.03.2017 or similar HGs updated annually shall be entered.
[5] 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).
[6] Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).
[7] Year of studies in which the discipline is provided in the curriculum.
[8] Discipline may have one of the following regimes: imposed discipline (DI), optional discipline (DO) or optional discipline (Df).
[9] 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.
[10] 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	• Classroom equipped with video projection means
5.2 to conduct practical activities	• Laboratory with endowments for experimentation adequate to the program and competencies to be acquired

6. Specific competencies acquired through this discipline

Specific competencies	• Defining the fundamental notions in the field of physical-chemistry and their use in professional communication. • Use of basic knowledge in the field of physical-chemistry to explain and interpret the engineering phenomena
Professional competencies ascribed to the specific competencies	• Description, analysis and use of the basic concepts and theories from chemistry and chemical engineering field • Processes and systems operation applying the knowledge from chemical engineering field • Achieving of some technological design elements, assisted management and optimization of the processes from the chemical profile industry • Interdisciplinary approach (based on knowledge of mathematics, physics and chemistry) of chemical engineering problems
Transversal competencies ascribed to the specific competencies	• Performing the profesional tasks in accordance with the specified requirements and imposed time, with the rules of professional ethics and moral conduct, following a predetermined work plan and qualified guidance • Solve the professional tasks in accordance with the overall objectives set by integrating in the working group and the distribution of tasks to subordinate levels • Information and permanent documentation in its field of interest in Romanian and in a foreign language with the use of modern information and communication

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

7.1 The general objective of the discipline	• Understanding the fundamental principles of chemical thermodynamics and their application in the case of processes of industrial or practical interest
7.2 Specific objectives	• Understanding the properties of the substances. Understanding the thermo-dynamics of the chemical processes. Creating competencies and abilities for understanding the properties of chemical species and interpreting molecular spectra, their practical application for qualitative, quantitative analysis or for the study of correlations between the structure and properties of substances. Explanation and interpretation of the experimental results.

8. Content [11]

8.1 Course	Number of hours	Teaching methods [12]
Structural properties of substances	6	Exposition,conversation, questioning, case study
Spectral properties of substances	4	
Electrical properties of molecules	4	
Fundamental notions of chemical thermodynamics	6	
First principle of thermodynamics	4	
Second principle of thermodynamic	4	

[11] 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 "(*)".
[12] Presentation of the teaching methods will include the use of new technologies (e-mail, personalized web page, electronic resources etc.).

Bibliography [13] I.G. Murgulescu, V.E. Sahini, "Introducere in Chimia Fizica, Structura si proprietatile moleculelor", vol.I.2, Ed. Academiei, Bucuresti, 1978.
C.M. Davidescu, „Introducere în Termodinamica Chimică", Ed. Politehnica, 2002.
P. W. Atkins, „Physical Chemistry", 8th Ed. Oxford University Press, Oxford, 2006

8.2 Applied activities [14]	Number of hours	Teaching methods
Radiation absorption laws	8	Experimental method. Method of practical work. Computer aided training
Spectrophotometric determination of an equilibrium constant	4	
IR spectroscopy in diatomic molecules, use of IR spectra of diatomic molecules to determine the interatomic distance and the force constant	4	
Electrical properties of molecules, molar refraction	4	
Electrical properties of molecules, refractometric analysis	4	
Ebulioscopia	4	

Bibliography [15] 1. C.M. Davidescu, C. Pacurariu, "Chimie Fizica", Litografia Universitatii Politehnica Timisoara, 1990
2. Radu Ardelean, Erika Reisz, Corneliu-Mircea Davidescu, Lucrari practice de chimie-fizica, Editura Politehnica, 2018

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

- The content of the discipline is in agreement with similar disciplines from the country and abroad as well as with the expectations of the professional associations and representative employers in the field

10. Evaluation

Type of activity	**10.1** Evaluation criteria [16]	**10.2** Evaluation methods	**10.3** Share of the final grade
10.4 Course	Knowledge of basic notions in the field of molecular spectra and in the field of chemical thermodynamics. Ability to apply the notions taught in the course.	3-hour written exam, based on questions with different degrees of difficulty that assess students' thinking ability.	66%
10.5 Applied activities	**S:**		
	L: Teamwork ability. Ability to process the experimental data and the way of how the paper is presented. Seriousness, punctuality.	Reports on experimental results, mathematic processing of experimental data and results interpretation. Verification test at the end of the semester.	34%

[13] 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.
[14] 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".
[15] At least one title must belong to the discipline team.
[16] 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.)

	P[17]**:**		
	Pr:		

10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified [18])

- Demonstrating the assimilation of the theoretical knowledge taught in the course and the ability to operate with these concepts
- Completion of the evaluation activity through the written exam with a minimum grade of 5.
- Demonstration of competence regarding the selection of the most appropriate experimental and / or analytical methods for solving practical problems.
- Completion of the laboratory activity with a minimum grade of 5

Date of completion	**Course coordinator (signature)**	**Coordinator of applied activities (signature)**
09.12.2020	……	……
Head of Department (signature)	**Date of approval in the Faculty Council** [19]	**Dean (signature)**
……		……

[17] 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.

[18] It will not explain how the promotion mark is awarded.

[19] The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.