

# SYLLABUS

## 1. Information about the program

1.1 Higher education institution	Politehnica University Timisoara
1.2 Faculty <sup>1</sup> / Department <sup>2</sup>	Chemical Engineering, Biotechnologies and Environmental Protection/ CAICAM
1.3 Field of study (name/code <sup>3</sup> )	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 <sup>4</sup>	Physical chemistry I / DD						
2.2 Coordinator (holder) of course activities	S.L. Dr Ing. Erika REISZ						
2.3 Coordinator (holder) of applied activities <sup>5</sup>	S.L. Dr Ing. Erika REISZ						
2.4 Year of study <sup>6</sup>	II	2.5 Semester	3	2.6 Type of evaluation	E	2.7 Regime of discipline <sup>7</sup>	DI

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

3.1 Number of fully assisted hours / week	5.5 of which:	3.2 course	2.5	3.3 seminar / laboratory / project	1/2/0
3.1* Total number of fully assisted hours / semester	77 of which:	3.2* course	35	3.3* seminar / laboratory / project	14/28/0
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	5.21 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			1.5
		hours of individual study after manual, course support, bibliography and notes			1.85
		training seminars / laboratories, homework and papers, portfolios and essays			1.86
3.7* Number of hours of unassisted activities / semester	73 of which:	additional documentary hours in the library, on the specialized electronic platforms and on the field			21
		hours of individual study after manual, course support, bibliography and notes			26
		training seminars / laboratories, homework and papers, portfolios and essays			26
3.8 Total hours / week <sup>9</sup>	10.71				
3.8* Total hours /semester	150				
3.9 Number of credits	6				

## 4. Prerequisites (where applicable)

4.1 Curriculum	• Mathematics, physics and analytical chemistry
----------------	---

<sup>1</sup> The name of the faculty which manages the educational curriculum to which the discipline belongs

<sup>2</sup> The name of the department entrusted with the discipline, and to which the course coordinator/holder belongs.

<sup>3</sup> The code provided in HG - on the approval of the Nomenclature of fields and specializations / study programs, annually updated.

<sup>4</sup> 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).

<sup>5</sup> Application activities refer to: seminar (S) / laboratory (L) / project (P) / practice/training (Pr).

<sup>6</sup> Year of studies in which the discipline is provided in the curriculum.

<sup>7</sup> 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).

<sup>8</sup> 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.

<sup>9</sup> 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	<ul style="list-style-type: none"> <li>• Notions of differential and integral calculus, thermodynamics and chemistry</li> </ul>
------------------	---

### 5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> <li>• Large classroom;</li> <li>• Supporting material - board</li> </ul>
5.2 to conduct practical activities	<ul style="list-style-type: none"> <li>• Seminar classroom</li> <li>• Physical chemistry laboratory</li> </ul>

### 6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> <li>•</li> </ul>
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> <li>• - Analyse production processes for improvement;</li> <li>• - Manage chemical testing procedures;</li> <li>• - Test materials;</li> <li>• - Write technical reports</li> <li>• -Performs chemical experiments</li> <li>• -Approve engineering design</li> <li>• -Assess environmental impact</li> </ul>

Transversal competencies ascribed to the specific competencies

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

<ul style="list-style-type: none"> <li>•</li> </ul>
---

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

7.1 The general objective of the discipline	<ul style="list-style-type: none"> <li>• Understanding the fundamental principles of physical chemistry and their application in the case of processes of industrial or practical interest</li> <li>•</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>• Defining basic notions, concepts, theories and models in the field of chemistry and engineering and their appropriate use in professional communication</li> <li>• Using basic knowledge in the field of chemistry and chemical engineering to explain and interpret engineering phenomena</li> <li>• Identification and application of concepts, methods and theories for solving problems typical of chemical engineering in conditions of qualified assistance</li> <li>• Critical analysis and use of working principles, methods and techniques for quantitative and qualitative evaluation of chemical engineering processes</li> <li>• Application of fundamental concepts and theories in the field of chemistry and chemical engineering for the elaboration of professional projects</li> <li>• Monitoring the processes in the chemical industry, identifying abnormal situations and proposing solutions in conditions of qualified assistance</li> <li>• Critical evaluation of processes, equipment, procedures and products in the chemical industry using specific evaluation tools and methods</li> <li>• Elaboration of professional projects for technologies in the field of chemical engineering</li> </ul>



1. Work safety	4	students at the beginning of the laboratory session; discussing the theoretical aspects, the way of working and the processing of experimental data; the actual performance of the laboratory work; checking the results obtained and grading the students
2. Visible spectrophotometry. Laws of radiation absorption	4	
3. Infrared spectrophotometry. IR spectrum analysis in diatomic molecules	4	
4. Infrared spectrophotometry. IR spectrum analysis for polyatomic molecules	4	
5. Electrical properties of molecules. Molar refraction. Refractometric analysis	4	
6. Electrical properties of molecules. Dipole moment	4	
7. Make-up sessions	4	
<b>SEMINAR</b>		
1. First law of thermodynamics. Applications of the first law of thermodynamics to isochoric, isobaric and isothermal processes	4	Written testing of students at the beginning of the seminar, solving some problems (on the board)
2. Hess's law. Calculation of the standard enthalpy of reaction using standard enthalpies of formation, combustion, dissociation of chemical bonds and by the method of processes combining	4	
3. Dependence of reaction enthalpy on temperature. Kirchhoff's law	4	
4. Second and third laws of thermodynamics	2	
<b>Bibliography</b> <sup>14</sup>		
1. Ardelean, R., Reisz, E., Davidescu, C. M., Lucrari practice de chimie fizica, Editura Politehnica, Timisoara, 2018		
2. Poraicu, M., Merca, E., Davidescu, C. M., Pacurariu, C., Parlea, G., Lucrari practice de chimie fizica, Litografia IPTVT, Timisoara, 1985		

### 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 Physical Chemistry discipline is in line 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 <sup>15</sup>	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course	Mastering the knowledge taught in the course	Written exam consisting of questions related to the subjects taught in the course and a problem	66.(6)%
10.5 Applied activities	<b>S:</b> Level of mastery of theoretical notions, the ability to solve problems and attendance at the seminar	Written test at the beginning of the seminar, answers to the questions asked during the seminar, solving a problem on the board and solving a problem in the exam	11.1%
	<b>L:</b> Level of mastery of theoretical notions, the way the student works in the laboratory, the way of processing experimental data	Written test at the beginning of the laboratory session, answers to the questions asked during discussions regarding laboratory work and the way of processing experimental data	22.2%

<sup>14</sup> At least one title must belong to the discipline team.

<sup>15</sup> 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.)

	<b>P<sup>16</sup>:</b>		
	<b>Pr:</b>		
<b>10.6</b> Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified <sup>17</sup> )			
<ul style="list-style-type: none"> <li>The answers to the questions must accumulate at least 10 points out of 20 and solving the problem must add up to 5 out of 10 points.</li> </ul>			

**Date of completion**

29.09.2024

**Course coordinator  
(signature)**

S.L. Dr Ing Erika REISZ

**Coordinator of applied activities  
(signature)**

S.L. Dr Ing Erika REISZ

**Head of Department  
(signature)**

Conf.dr.ing. Andrea  
KELLENBERGER

**Date of approval in the Faculty Council <sup>18</sup>**

**Dean  
(signature)**

S.L.dr.ing. Mircea DAN

---

<sup>16</sup> 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.

<sup>17</sup> It will not explain how the promotion mark is awarded.

<sup>18</sup> The endorsement is preceded by the discussion of the board's view of the study program on the discipline record.