

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 / Matematica
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	Probabilities and Statistics / DF						
2.2 Coordinator (holder) of course activities	Conf.Dr. Jivulescu Maria						
2.3 Coordinator (holder) of applied activities ⁵	Conf.Dr. Jivulescu Maria						
2.4 Year of study ⁶	II	2.5 Semester	3	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	4 of which:	3.2 course	2	3.3 seminar / laboratory / project	1/1/0
3.1* Total number of fully assisted hours / semester	56 of which:	3.2* course	28	3.3* seminar / laboratory / project	14/14/0
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	3.14 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			1.14
		training seminars / laboratories, homework and papers, portfolios and essays			1
3.7* Number of hours of unassisted activities / semester	44 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			16
		training seminars / laboratories, homework and papers, portfolios and essays			14
3.8 Total hours / week ⁹	7.14				
3.8* Total hours /semester	100				
3.9 Number of credits	4				

4. Prerequisites (where applicable)

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.

4.1 Curriculum	<ul style="list-style-type: none"> Linear Algebra, Mathematical Analysis
4.2 Competencies	<ul style="list-style-type: none"> Logic, Mathematical Thinking

5. Conditions (where applicable)

5.1 of the course	<ul style="list-style-type: none"> Black (white)board, Graphical tablet,
5.2 to conduct practical activities	<ul style="list-style-type: none"> Black (white)board, Graphical tablet, Matlab licence

6. Specific competencies acquired through this discipline

Specific competencies	<ul style="list-style-type: none"> To study techniques coming from Mathematical Analysis, with applications to the optimization of chemical processes and environment To model chemical phenomena using mathematical methods
Professional competencies ascribed to the specific competencies	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Conduct quality control; - Apply scientific, technological and engineering knowledge; - Uses equipment, instruments or technological equipment accurately.

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"> To study and acquire basic notions from probability theory and mathematical statistics to study chemical phenomena
7.2 Specific objectives	<ul style="list-style-type: none"> To develop abilities for statistical analysis

8. Content¹⁰

8.1 Course	Number of hours	Teaching methods ¹¹
1. Introduction into Probability Theory	2	Explications, proofs and concrete examples
2. Conditional probability. Independence	2	
3. Bayes formula	2	
4. Discrete random variable. Mean. Dispersion	2	
5. Classical discrete random variable	2	
6. Continuous random variable	2	
7. Classical random variables	2	
8. Random vectors	2	
9. Introduction into statistics	2	
10. Estimation theory. Punctual estimators	2	

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.).

11. Maximum likelihood estimator	2	
12. Central limit theorem	2	
13 Correlation	2	
14. Linear regression	2	
Bibliografie ¹² 1. E. Petrisor – Probabilitati si Statistica . Aplicatii pentru Economie si Inginerie, Editura Politehnica, 2001; 2. I. Golet, M.A. Jivulescu, C. Petrisor; Probleme de Teoria Probabilitatilor, Editura Politehnica, 2010; 3. C. Reischer, A. Samboan, Probleme de Teoria Probabilitatilor,, Editura Didactica si Pedagogica -Bucuresti, 1972		
8.2 Applied activities ¹³	Number of hours	Teaching methods
1. Applications into probability theory	4	Solving exercises
2. Conditional Probability. Bayes formula	4	
3. Random variables	8	
4. Descriptive statistics	4	
5. Estimation theory	4	
6. Correlation Linear regression	4	
Bibliography ¹⁴ 1. E. Petrisor – Probabilitati si Statistica . Aplicatii pentru Economie si Inginerie, Editura Politehnica, 2001; 2. I. Golet, M.A. Jivulescu, C. Petrisor; Probleme de Teoria Probabilitatilor, Editura Politehnica, 2010; 3. C. Reischer, A. Samboan, Probleme de Teoria Probabilitatilor,, Editura Didactica si Pedagogica -Bucuresti, 1972		

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

<ul style="list-style-type: none"> The program agrees with the necessity to acquire tools to study and understand set of data. For this reason at technical university the courses of Probability Theory and Statistics are present such as: 18-175, MIT Course on Probability Theory https://ocw.mit.edu/courses/18-175-theory-of-probability-spring-2014/, CHEM_ENG 312: Probability and Statistics for Chemical Engineering, https://www.mccormick.northwestern.edu/chemical-biological/academics/courses/descriptions/312-0.html https://shnaton.huji.ac.il/index.php/NewSyl/52104/2/2023/
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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 ability to solve problems	Evaluate the knowledge and the understanding of the basics techniques and notions from theory; evaluate the ability solve problems and exercises	Written exam
10.5 Applied activities	S: solve exercises	Solve concrete examples	Two tests during the semester
	L: use Matlab for basic use	Evaluate the ability to solve mathematical problems with Matlab	Lab test

¹² Cel puțin un un titlu trebuie să aparțină colectivului disciplinei iar cel puțin un titlu trebuie să se refere la o lucrare de referință pentru disciplină, de circulație națională și internațională, existentă în biblioteca UPT.

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.

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.)

	P¹⁶:		
	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)			
<ul style="list-style-type: none"> Basics knowledge from descriptive statistics 			

Date of completion

Course coordinator
Conf.dr. Maria Jivulescu
(signature)

Coordinator of applied activities
Conf.dr. Maria Jivulescu
(signature)

Head of Department
(signature)

Conf.univ. dr. Tudor BÎNZAR

Date of approval in the Faculty Council ¹⁸

Dean
(signature)

Ş.L.dr.ing. Mircea Laurenţiu DAN

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.