SYLLABUS[1]

1. Information about the program

1.1 Higher education institution	POLITEHNICA UNIVERSITY OF TIMISOARA
1.2 Faculty[2] / Department[3]	MATHEMATICS
1.3 Chair	▬
1.4 Field of study (name/code[4])	Applied Engineering Sciences
1.5 Study cycle	Mechanical engineering, industrial engineering and management
1.6 Study program (name/code/qualification)	Statistical Methods and Techniques in Health and Clinical Research

2. Information about the discipline

2.1 Name of discipline	STATISTICAL INFERENCE						
2.2 Coordinator (holder) of course activities	Associate Professor GOLEȚ IOAN						
2.3 Coordinator (holder) of applied activities [5]	Associate Professor GOLEȚ IOAN						
2.4 Year of study[6]	I	**2.5** Semester	1	**2.6** Type of evaluation	E	**2.7** Type of discipline	DCA

3. Total estimated time (hours / semester of didactic activities)

3.1 No. of hrs. / week	4 , of which:	**3.2** course	2	**3.3** seminar/laboratory/ project/training		2
3.4 Total no. of hrs. in the education curricula	56 , of which:	**3.5** course	28	**3.6** applied activities		28

3.7 Distribution of time for individual activities related to the discipline	hrs.
Study using a manual, course materials, bibliography and lecture notes	22
Additional documentation in the library, on specialized electronic platforms and on the field	14
Preparation for seminars / laboratories, homeworks, assignments, portfolios, and essays	21
Tutoring	14
Examinations	3
Other activities	
Total hrs. of individual activities	57

3.8 Total hrs. / semester[7]	130
3.9 No. of credits	7

4. Prerequisites (where applicable)

4.1 Curriculum	• -
4.2 Competencies	• Knowledge of mathematical statistics

5. Conditions (where applicable)

5.1 of the course	• The classroom, whiteboard
5.2 to conduct practical activities	• The classroom, whiteboard

6. Specific competencies acquired

Professional competencies[8]	• The design of statistical models to describe complex phenomena from clinical research and human health. • To acquire and specific statistical inference tools for dealing with medical scientific research. • Logic skills training, development and analysis of algorithms for solving problems by computer programs in Mat Lab and R-system
Transversal competencies	• The effective and efficient organized team activities specific to clinical research • Honorable behavior, responsible, ethical, within the national and international law to ensure problem resolution in the clinical research and human health • Proving spirit of initiative and action to update professional knowledge, economic and organizational medical culture

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

7.1 General objective of the discipline	• Equip students with the fundamental concepts of statistical inference necessary for the design / settlement / handling problems / processes
7.2 Specific objectives	• Acquisition of numeracy, the ability to understand, synthesize and interpret the results obtained by methods of statistical inference chapters that rely on it. • Develop the capacity to understand the fundamental elements of a judgment, to make a ranking between different levels of abstraction and applications in clinical research and health . • Formation of ability to use statistical literature effectively.

8. Content

8.1 Course	No. of hours	Teaching methods
Statistical modeling. Organization and description of data. Graphical representations. Summarizing numerical data.	2	Demonstration, dialogue, debate, problem solving, exemplification
Analysing means and proportions. Inferences from means and proportions. Sample-size determinations. Applications to clinical research and health	4	Demonstration, dialogue, debate, problem solving, exemplification
Analysing variances, counts and other measures. Inferences from variances and counts. Maximum likelihood estimations. Method of moments.	4	Demonstration, dialogue, debate, problem solving, exemplification
Bayesian methods. Bayesian inference for a mean. Bayesian inference for proportions and counts. Applications to clinical trials. Special designs. Elements of meta-analysis.	4	Demonstration, dialogue, debate, problem solving, exemplification
Confidence intervals for means, variances, mean differences of two populations, variance ratio of two populations, proportions for a binomial population, large populations. Applications to clinical research, epidemiology, farmacology.	4	Demonstration, dialogue, debate, problem solving, exemplification
Statistical hypotheses testing. Types of statistical tests. The most powerful test. Testing the type of data. Parametric tests. Goodness of fit tests. Diagnostic tests.	6	Demonstration, dialogue, debate, problem solving, exemplification
Correlation. Regression. Autocorrelation. Correlation coefficients. Tests for regression coefficients. Survey on clinical research applications	4	Demonstration, dialogue, debate, problem solving,

		exemplification

Bibliography[9]   Ioan Goleţ – Probability and Statistics, Ed. Politehnica, Timişoara, 2009 (in romanian); D. P. Bertsekas & J.N. Tsitsiklis, Introduction to Probability Problem Solutions, Massachussets Inst.of Technology,2007; A. Zafar, Introduction to Clinical Biostatistics for Medical Students, Dept. of Medicine, Indiana Univ.of Medicine,2008

8.2 Applied activities[10]	No. of hours	Teaching methods
Statistical modeling. Organization and description of data. Graphical representations. Summarizing numerical data.	2	Problem solving, exemplification, Matlab applications
Analysing means and proportions. Inferences from means and proportions. Sample-size determinations. Applications to clinical research and health	4	Problem solving, exemplification, Matlab applications
Analysing variances, counts and other measures. Inferences from variances and counts. Maximum likelihood estimations. Mehod of moments.	4	Problem solving, exemplification, Matlab applications
Bayesian methods. Bayesian inference for a mean. Bayesian inference for proportions and counts. Applications to clinical trials. Special designs. Elements of meta-analysis.	4	Problem solving, exemplification, Matlab applications
Confidence intervals for means, variances, mean differences of two populations, variance ratio of two populations, proportions for a binomial population, large populations. Applications to clinical research, epidemiology, farmacology	4	Problem solving, exemplification, Matlab applications
Statistical hypotheses testing. Types of statistical tests. The most powerful test. Testing the type of data. Parametric tests. Goodness of fit tests. Diagnostic tests.	6	Problem solving, exemplification, Matlab applications
Correlation. Regression. Autocorrelation. Correlation coefficients. Tests for regression coefficients. Survey on clinical research applications	4	Problem solving, exemplification, Matlab applications

Bibliography [11]   Ioan Goleţ – Probability and Statistics, Ed. Politehnica, Timişoara, 2009 (in romanian; D. P. Bertsekas & J.N. Tsitsiklis, Introduction to Probability Problem Solutions, Massachussets Inst.of Technology,2007; A. Zafar, Introduction to Clinical Biostatistics for Medical Students, Dept. of Medicine, Indiana Univ.of Medicine,2008

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

- Understanding the correct use of statistics in clinical research and health and engineering sciences is essential.
- Discipline creates special statistical skills of students on which they will be able to meet the requirements of the labor market in various areas or to continue research in the higher stages of study

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[9] At least one title must belong to the department staff teaching the discipline, and at least 3 titles must refer to national and international works relevant for the discipline, and which can be found in the Politehnica University Library.
[10] The types of applied activities are those specified in footnote 5. If the discipline contains several types of applied activities, then these will be written consecutively in the lines of the table below. The type of activity will be written in a distinct line, as „Seminar:", „Laboratory:", „Project:" and/or „Practice/Training:".
[11] At least one title must belong to the staff teaching the discipline.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share of the final grade
10.4 Course		Examination at the end of the semester. The final mark is computed as arithmetical mean of examination mark and seminar mark	2/3
10.5 Applied activities	**S:**	2 test papers, evaluation of homework, individual activity ,	1/3
	L:		
	P:		
	Pr:		
10.6 Minimum performance standard (minimum amount of knowledge necessary to pass the discipline and the way in which this knowledge is verified)			
• The student have to posesses the ability of using effective 50% of the expected level of knowledge			

Date of completion	Course coordinator (signature)	Coordinator of applied activities (signature)
11.12.2015	………………….…………	………………….…………

Head of Department (signature)	Date of approval in the Faculty Council[12]	Dean (signature)
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[12] Avizarea este precedată de discutarea punctului de vedere al board-ului de care aparţine programul de studiu cu privire la fişa disciplinei.