FISA DISCIPLINEI
Syllabus

1. Information about the program

1.1. University	West University of Timisoara
1.2. Faculty	PHYSICS
1.3. Department	PHYSICS
1.4. Study direction	PHYSICS
1.5. Study cycle	MASTER
1.6. Study program / qualification	Advanced research methods in physics / according to COR: Analyst - 251201; Research assistant in physics - 211103; Physicist - 211101; Teacher - 233002;

2. Subject matter information

2.1. Subject matter			Statistical methods for data analyzing				
2.2. Subject teacher			Paulescu Eugenia				
2.3. Subject applications teacher (seminar / laboratory)			Paulescu Eugenia				
2.4. Study year	1	2.5. Semester	2	2.6. Assessment type	**E**	2.7. Discipline regime	**DO**

3. Study time distribution

3.1. Nr. of hours/week	4	In which: 3.2 course	2	3.3. seminar/laboratory	2
3.4. Total hours in educational plan	56	In which: 3.5 course	28	3.6. seminar/laboratory	28

Time distribution:	**hours**
Study after lecture notes, bibliography or notes	56
Additional documentation in the library, electronic specialty platforms/ field	14
Seminar / laboratory preparations, homework, portfolio and essays	14
Tutoring	
Exams	6
Other activities...	4

3.7. **Total number of personal study hour**	94
3.8. **Total number of hours in semester**	150
3.9. **Number of credits**	6

4. Preconditions (where appropriate)

4.1. Curriculum	Mathematics
4.2. Competences	Elementary knowledge of R

5. Conditions (where appropiate)

5.1 for course	Individual access to computer
5.2 for seminar/lab	Individual access to computer

6. Subject objectives - expected learning outcomes to the formation due to the course and promotion of the discipline

Knowledge	• to know the advanced notions in the field of Physics, which involves a critical understanding of theories and principles • to know the working formulas for calculations with physical quantities using properly the principles and laws of physics • to know the language specific to the field
Skills	• to deduce the working formulas for calculations with physical quantities, using appropriately the principles and laws of physics • To describe physical systems using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.) • to apply the principles and laws of physics in solving theoretical or practical problems, under conditions of qualified assistance • To use high-level mathematical skills to solve conceptual and quantitative problems in physics
Responsibility and autonomy	• to critically analyze a specialized report, scientific communication with a medium degree of difficulty in the field of physics • to autonomously use information sources and resources for communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) both in Romanian and in a language of international circulation

7. Table of content

7.1 Course	**Teaching methods**	**Observations**
1. Elements of Probability	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
2. Permutations and Combinations	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
3. Random Variables and Distributions	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/

4. Properties of Distributions	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
5. Probabitity Generating Functions.	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
6. Important Discrete Distributions	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
7. Important Continuous Distributions	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
8. Joint Distributions	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
9. Descriptive Statistics	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
10. Parameter Estimations	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
11. Hypothesis Testing	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
12. Regression	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
13. Analysis of Variance	Interactive lecture	Statistical Methods. Lecture notes http://www.physics.uvt.ro/ ~eugeniat/ metode_statistice/
14. Recapitulation of knowledge		
7.2 Seminar:		
1. Conditional Probability		
2. Bayes' Formula		
3. Variance and Standard Deviation		
4. Moments and Central Moments		
5. Moment Generating Functions		

6. The Poisson random Variables
7. Distributions Arising from the Normal
8. Covariance and Correlation
9. The Central Limit Theorem
10. Confidence Intervals
11. Paired t-Test
12. Multiple Linear Regression
13. ANOVA
14. Checking knowledge
1.D. C. Montgomery, G.C. Runger, Applied Statistics and Probability for Engineers, Ediţia a cincea, John Wiley and Sons, 2011. 2. K.F. Riley, M.P. Hobson, S.J. Bence, Mathematical Methods for Physics and Engineering, Third Edition, Cambridge 2006. 3. M.J. Crawley, Statistics: An Introduction Using R. 2nd Edition. John Wiley, New York, 2015. 4. Sheldon M. Ross, INTRODUCTION TO PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS, Fifth Edition, Elsevier. 2014 5. E. Paulescu, *Metode statistice*, Notite de curs si seminar. http://www.physics.uvt.ro/~eugeniat

8. Relation between subject content and the expectations of employers

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9. Assesment

Activity type	9.1 Assesment criteria	9.2 Assesment method	9.3 Percent in final mark
9.4 **Lecture**	The evaluation has a continuous component that involves solving 10 homework problem sheets and a final component that consists of a written evaluation.	Written test with 10 questions/problems	**70%**
9.5 **Seminar/labs**	The mark 10 will be awarded to students who demonstrate the ability to apply and clearly explain all the required material.	**Continuous assessment** 10 homework problem sheets	**30%**
9.6 **Minimum performance standards**			
• The mark 5 will be obtained for showing a basic undersanding of the coure concepts.			

Completion date: 23.01.2025

Subject teacher's signature: Eugenia Paulescu

Subject applications teacher's signature:

Department Director' Signature: Conf. dr. Nicoleta Stefu