

FIȘA DISCIPLINEI

1. Date despre program

1.1 Instituția de învățământ superior	Universitatea de Vest din Timișoara
1.2 Facultatea / Departamentul	Matematica si Informatica
1.3 Departamentul	Informatica
1.4 Domeniul de studii	Master
1.5 Ciclul de studii	2
1.6 Programul de studii / Calificarea	Big Data – Data Science, Analytics and Technologies

2. Date despre disciplină

2.1 Denumirea disciplinei	Data Analysis and Programming in R						
2.2 Titularul activităților de curs	Lect. dr. Raluca Muresan						
2.3 Titularul activităților de seminar	Lect. dr. Raluca Muresan						
2.4 Anul de studiu	1	2.5 Semestrul	1	2.6 Tipul de evaluare	Examen	2.7 Regimul disciplinei	

3. Timpul total estimat (ore pe semestru al activităților didactice)

3.1 Număr de ore pe săptămână	3	din care: 3.2 curs	2	3.3 seminar/laborator	1
3.4 Total ore din planul de învățământ	42	din care: 3.5 curs	28	3.6 seminar/laborator	14
Distribuția fondului de timp:					ore
Studiul după manual, suport de curs, bibliografie și notițe					36
Documentare suplimentară în bibliotecă, pe platformele electronice de specialitate / pe teren					23
Pregătire seminare / laboratoare, teme, referate, portofolii și eseuri					32
Tutoriat					14
Examinări					3
Alte activități					
3.7 Total ore studiu individual	108				
3.8 Total ore pe semestru	150				
3.9 Numărul de credite	6				

4. Precondiții (acolo unde este cazul)

4.1 de curriculum	<ul style="list-style-type: none"> Probability and Statistics
4.2 de competențe	<ul style="list-style-type: none"> Programming skills

5. Condiții (acolo unde este cazul)

5.1 de desfășurare a cursului	<ul style="list-style-type: none"> lecture hall with overhead projector
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5.2 de desfășurare a seminarului / laboratorului	<ul style="list-style-type: none"> computer with an internet connection; R software installed (https://www.r-project.org)
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6. Obiectivele disciplinei - rezultate așteptate ale învățării la formarea cărora contribuie parcurgerea și promovarea disciplinei

Cunoștințe	Knowledge of basic statistics and regression models
Abilități	Modeling skills for specific phenomena and processes in the domains: economic, technic, medical, social etc., by using fundamental mathematical, statistical, and computer science knowledge;
Responsabilitate și autonomie	Developing and testing a regression model

7. Conținuturi

8.1 Curs	Metode de predare	Observații
C1. General facts about R. Objects and attributes	Lecturing, conversation, demonstration	Resources: [1], Ch. 1
C2. Lists, matrices and dataframes	Lecturing, conversation, demonstration	Resources: [1], Ch. 1
C3. Elements of programming in R	Lecturing, conversation, demonstration	Resources: [4], Ch. 4
C4. Probability distributions. Generating random numbers following a particular probability distribution	Lecturing, conversation, demonstration	Resources: [4], Ch. 5
C5. Elements of descriptive statistics in R	Lecturing, conversation, demonstration	Resources: [1], Ch. 2, [2], Ch. 2,3
C6. Tools for visualization. The ggplot2 package. Multivariate exploratory analysis	Lecturing, conversation, demonstration	Resources: [1], Ch. 2, [2], Ch. 2,3
C7-8. Tools for estimation and statistical hypothesis testing	Lecturing, conversation, demonstration	Resources: [1], Ch. 4, [2], Ch. 6
C9-10. Predicting continuous responses: correlation and linear regression	Lecturing, conversation, demonstration	Resources: [1], Ch. 5
C11-12. Predicting quantitative responses	Lecturing, conversation, demonstration	Resources: [2], Ch. 9, [3], Ch. 7-11
C13-14. Case studies	Lecturing, conversation, demonstration	Resources: [3], Ch. 20
Bibliografie :		

J. Maindonald, W. J. Braun, Data Analysis and Graphics using R – An Example – based Approach, 3rd ed., Cambridge University Press, 2003 2. T. Fischetti, Data Analysis with R, Packt Publishing, 2015 3. J. Ledolter, Data Mining and Business Analytics with R, Wiley, 2013 4. W. J. Braun, D. J. Murdoch, A First Course in Statistical Programming with R, Cambridge University Press, 2007 5. J. M. Chambers, Software for Data Analysis. Programming with R, Springer, 2008			
8.2 Seminar / laborator	Metode de predare	Observații	
1. Introduction to R. Objects and attributes. Dataframes. Packages	Dialogue with students, cooperative learning, modeling, case studies		
2. Programming in R	Dialogue with students, cooperative learning, modeling, case studies		
3. Estimating probability by simulation	Dialogue with students, cooperative learning, modeling, case studies		
4. Tools for descriptive statistics	Dialogue with students, cooperative learning, modeling, case studies		
5. Testing statistical hypotheses with R	Dialogue with students, cooperative learning, modeling, case studies		
6. Univariate and multivariate linear regression	Dialogue with students, cooperative learning, modeling, case studies		
7. Logistic regression models	Dialogue with students, cooperative learning, modeling, case studies		
Bibliografie : Same as for the lecture			

8. Coroborarea conținuturilor disciplinei cu așteptările reprezentanților comunității epistemice, asociațiilor profesionale și angajatori reprezentativi din domeniul aferent programului

The course is consistent with similar ones from representative universities and covers the most important aspects regarding data analysis. The concepts are presented using the open source software R, currently one of the most widely used tools for data analysis, in teaching, research, as well as practical applications. The skills acquired are necessary for a person working in IT in order to analyze a set of data and make predictions.

9. Evaluare

Tip activitate	10.1 Criterii de evaluare	10.2 Metode de evaluare	10.3 Pondere din nota finală
10.4 Curs	Knowing and following the appropriate steps	Project	60%

	in a data analysis process		
	Knowledge of specific methods and algorithms and using suitable techniques to solve a practical problem		
10.5 Seminar / laborator	Using R tools to analyze a dataset	Lab activity	40%
<p>10.6 Standard minim de performanță Minimal standards (knowledge and skills for the grade 5)</p> <ul style="list-style-type: none"> • Exploratory data analysis: producing simple graphical representations to investigate the relation between two or more variables and interpreting them • Prediction: describing a regression technique <p>The final grade is the weighted average of grades obtained for components 10.4 and 10.5. The exam is passed if the final grade is at least 5 (it is not necessary for each grade to be greater than 5). For every exam session, the grade is computed by the same rule.</p> <p>During the semester, students may attend tutoring hours, during which the teacher answers their questions and provides supplementary explanations regarding the lecture, lab applications and homework.</p>			

Data completării
15.09.2023

Titular de disciplină
Lect. dr. Raluca Muresan

Data avizării în departament

Director de departament
Conf. dr. Flavia Micota