1. Information regarding the programme

1.1 Higher education institution	**Babeș-Bolyai University of Cluj-Napoca**
1.2 Faculty	**Faculty of Mathematics and Computer Science**
1.3 Department	**Department of Computer Science**
1.4 Field of study	**Computer Science**
1.5 Study cycle	**Master**
1.6 Study programme / Qualification	**Cyber Security**

2. Information regarding the discipline

2.1 Name of the discipline			**Business Forecasting and Predictive Modelling** **Prognoză și modelare predictivă pentru afaceri**			
2.2 Course coordinator			**Lect. Dr. Zsuzsanna Oneț-Marian**			
2.3 Seminar coordinator			**Lect. Dr. Zsuzsanna Oneț-Marian**			
2.4. Year of study	**2**	2.5 Semester	**3**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Optional**
2.8 Code of the discipline		MME8210				

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

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	1+1
3.4 Total hours in the curriculum	56	Of which: 3.5 course	28	3.6 seminar/laboratory	28

Time allotment:	hours
Learning using manual, course support, bibliography, course notes	20
Additional documentation (in libraries, on electronic platforms, field documentation)	20
Preparation for seminars/labs, homework, papers, portfolios and essays	20
Tutorship	7
Evaluations	2
Other activities:	-

3.7 Total individual study hours	69
3.8 Total hours per semester	125
3.9 Number of ECTS credits	5

4. Prerequisites (if necessary)

4.1. curriculum	Algorithmics, data structures, statistics
4.2. competencies	Ability to use data analytics computer software

5. Conditions (if necessary)

5.1. for the course	- Students will attend the course with their mobile phones silenced. - Room with a good video projector is needed
5.2. for the seminar /lab activities	Students will attend the seminar with their mobile phones silenced.

6. Specific competencies acquired

Professional competencies	- Understanding the concepts, methods and models used in forecasting and predictive data modelling. - Understanding the principles, design, and implementation of various forecasting methods. - Learning to conduct incipient original research in forecasting and predictive data modelling.

	• The ability to apply forecasting methods in solving real world problems. • Responsible execution of lab assignments, research and practical reports. • Application of efficient and rigorous working rules. • Manifest responsible attitudes toward the scientific and didactic fields. • Respecting the professional and ethical principles.
Transversal competencies	

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• To introduce the student in forecasting and predictive modelling
7.2 Specific objective of the discipline	• To present the field of forecasting and predictive modelling as a novel research and application domain. • To induce the necessity of forecasting and predictive modelling methods by studying relevant practical applications • To offer the student the instruments that will allow to develop different forecasting applications.

8. Content

8.1 Course	Teaching methods	Remarks
1: Administration and organization	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
2: Introduction to forecasting		
3: SAS, R and other software packages		
4: Time series graphics and decomposition		
5-6: Exponential smoothing		
7-8: Forecasting with ARIMA models		
9-10: Multiple regression and forecasting		
11: Advanced methods		
12-13: ML based methods		
14: Recap		

Bibliography
R.J. Hyndman, G. Athanasopoulos Forecasting: Principles and Practice, OTexts, 3rd edition, 2018.
P.J. Brockwell, R.A. Davis, Introduction to Time Series and Forecasting, Springer Verlag, 2nd edition, 2002.
D.C. Montgomery, C.L. Jennings, M. Kulahci, Introduction to Time Series Analysis and Forecasting, Wiley, 2nd edition, 2015.
M. Huber, D. Modlin, C. Wells. Forecasting Using Model Studio in SAS Viya, 2020
V. Zoonekynd, Statistics with R, 2007

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Administration	• Interactive exposure • Explanation • Conversation	
2-5. Work to prepare the reports / Optional exercises		
6. Delivery of the experimental report		
7. Delivery of the experimental report		

Bibliography
R.J. Hyndman, G. Athanasopoulos Forecasting: Principles and Practice, OTexts, 3rd edition, 2018.
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D.C. Montgomery, C.L. Jennings, M. Kulahci, Introduction to Time Series Analysis and Forecasting, Wiley, 2nd edition, 2015.
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V. Zoonekynd, Statistics with R, 2007

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The content of the discipline is consistent with the similar disciplines from other Romanian universities and universities from abroad, as well as with the requirements that potential employers would have in the forecasting and predictive modelling field.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	The correctness and completeness of the accumulated knowledge.	Written exam (in the exam session)	50%
10.5 Seminar/lab activities	An experimental research report containing the application of the methods and techniques discussed during the lecture on some data sets, should be prepared and presented	Evaluation of the research report (a written paper and an oral presentation)	50%

10.6 Minimum performance standards

Students have to prove that they acquired an acceptable level of knowledge and understanding of the forecasting and predictive modelling domain, that they are capable of stating this knowledge in a coherent form, that they have the ability to establish certain connections and to use the knowledge in solving different problems.
 	
Class attendance is neither formally required nor observed.
Successful passing of the exam is conditioned by:
   - The final grade that has to be at least 5
   - The written exam grade has to be at least 5
 	
Penalty points are awarded for delays in submission of proposed topic choices and submission of final reports.

Date   Signature of course coordinator   Signature of seminar coordinator
30.04.2024   Lect. dr. Oneț-Marian Zsuzsanna   Lect. dr. Oneț-Marian Zsuzsanna

Date of approval   Signature of the head of department
                                       Assoc. prof. Sterca Adrian