SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babeş-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	**Data Science in Industry and Society**

2. Information regarding the discipline

2.1 Name of the discipline				**Forecasting and Predictive Modelling**			
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	**Compulsory**
2.8 Code of the discipline		MME8187					

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						40
Additional documentation (in libraries, on electronic platforms, field documentation)						42
Preparation for seminars/labs, homework, papers, portfolios and essays						50
Tutorship						4
Evaluations						8
Other activities:						-

3.7 Total individual study hours	144
3.8 Total hours per semester	200
3.9 Number of ECTS credits	8

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 shut down
5.2. for the seminar /lab activities	• Students will attend the seminar with their mobile phones shut down • Room with computers as needed; data analytics computer software

6. Specific competencies acquired

Professional competencies	• Understanding the concepts, methods and models used in intelligent data analysis. • Understanding the principles, design and implementation of various data analysis methods • Learning to conduct incipient original research in intelligent data analysis

Transversal competencies	• The ability to apply intelligent data analysis 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.

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 data analysis 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: Dynamic regression		
12: Advanced methods		
13-14: Theoretical and experimental report presentation		

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 theoretical report (Seminar 6 and Lecture 13)		
7. Delivery of the experimental report (Seminar 7 and Lecture 14)		

Bibliography
R.J. Hyndman, G. Athanasopoulos Forecasting: Principles and Practice, OTexts, 3rd edition, 2018.
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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 intelligent data analysis 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 regular session)	20%
	A state-of-the-art research report on a relevant topic, based on recent research papers, should be prepared and presented	Evaluation of the research report (a written paper of about 10 pages and an oral presentation)	40%
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)	40%

10.6 Minimum performance standards
Each student has to prove that (s)he acquired an acceptable level of knowledge and understanding of the forecasting and predictive modelling domain, that (s)he is capable of stating this knowledge in a coherent form, that (s)he has the ability to establish certain connections and to use the knowledge in solving different problems.

Penalty points are awarded for delays in submission of proposed topic choices and submission of final reports.

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
- Presenting at least one report
- The grade for at least one report has to be at least 5.

No reports may be submitted or presented after the end of the 14-th school week.

Date	Signature of course coordinator	Signature of seminar coordinator
27.04.2023	Lect. dr. Zsuzsanna Oneț-Marian	Lect. dr. Zsuzsanna Oneț-Marian

Date of approval   Signature of the head of department
                                                       Prof. dr. Laura Dioșan