



**National University of Science and Technology
POLITEHNICA Bucharest**
Faculty of Automatic Control and Computers



SYLLABUS

1. Program information

1.1 Higher Education Institution	National University of Science and Technology POLITEHNICA Bucharest
1.2 Faculty	Faculty of Automatic Control and Computer
1.3 Department	Computer Science
1.4 Domain	Computers and Information Technology
1.5 Study program	Artificial Intelligence
1.6 Study cycle	Masters
1.7 Teaching language	English
1.8 Geographical location of the studies	Bucharest

2. Course data

2.1 Course title (ro) (en)	Mineritul datelor Data Mining						
2.2 Course holder	Prof. dr. ing. Irina Mocanu						
2.3 Seminar/ Laboratory/ Project holder	Prof. dr. ing. Irina Mocanu						
2.4 Academic year	1	2.5 Semester	I	2.6. Evaluation type	E	2.7 Course regime	Ob ¹
2.8 Type of discipline	DS ²		2.9 Discipline code		UPB.03.CTI.M.05.E.I.Ob.3		

3. Total estimated time (hours of activity per semester)

3.1 Number of hours per week	4	3.2 course	2	3.3 seminary/ laboratory/ project	2
3.4 Total hours of the curriculum	56	3.5 course	28	3.6 seminary/ laboratory/ project	28
Distribution of time:					ore
Study by manual, course support, bibliography, and notes Additional documentation in the library, on specialized platforms and on the ground Preparing seminars / laboratories / practical works / projects, themes, papers					62
Tutoring					3
Examinations					4
Other activities (if any):					0
3.7 Total hours of individual study		69			
3.8 Total hours per semester		125 ³			
3.9 Number of ECTS		5 ⁴			

4. Prerequisites (where applicable)

4.1 curriculum	Completing and/or passing the following disciplines: Computer Programming, Data Structures and Algorithms, Software engineering.
4.2 learning outcomes	Acquiring the following knowledge: Good command of a programming language, basic knowledge of Python.

5. Requirements for the optimal performance of teaching activities (where applicable)

¹ Obligatorie / Opțională / Facultativă – Se va completa conform planului de învățământ.

² de aprofundare/ de sinteză / complementare – Se va completa conform planului de învățământ..

³ Se va calcula ținând cont că se acordă un credit pentru volumul de muncă care îi revine unui student cu frecvență la zi pentru a echivala 25 de ore de pregătire pentru dobândirea rezultatelor învățării.

⁴ Se va completa conform planului de învățământ.



5.1 Lecture	<ul style="list-style-type: none">• The course will be taught in an interactive way using presentations and examples• The course will take place in a room equipped with video projector and computer.• Students will have access to the digital support of the course and its bibliography
5.2 seminary/laboratory/ project	<ul style="list-style-type: none">• The laboratory will take place in a room equipped with computers and a video projector• Students will have access to the laboratory's digital support and its bibliography• Students will use the computers to solve the practical exercises in the laboratory support

6. General objective of the course

This discipline is studied within the field of data mining. It aims to familiarize students with the main approaches, models, and explanatory theories of the field, used in solving practical applications and problems relevant to stimulating the learning process in students.

The discipline addresses specific concepts and principles for data mining, that will contribute to forming an overview of the methodological and procedural references related to the field to the students. The following aspects are presented to students: association rules and sequential patterns, supervised learning, unsupervised learning, semi supervised learning, Web usage mining, data warehousing and dimensional modeling.

7. Learning outcomes

Knowledge	<ul style="list-style-type: none">• Describe and differentiate between specific concepts that are used for data mining, such as association rules and sequential patterns, supervised learning, unsupervised learning, semi supervised learning, Web usage mining, data warehousing and dimensional modeling.• Define specific notions in the field.• Understand and describe specific mechanisms and tools for developing and implementing applications for data mining.
Skills	<ul style="list-style-type: none">• Implement applications using methods and technologies for data mining.• Justify the identified solutions and methods.• Solve practical applications.• Experimentally test the implemented applications.• Argue the identified solutions and methods of resolution.• Formulate conclusions based on the conducted experiments.



Responsibility and autonomy	<ul style="list-style-type: none">• Select appropriate bibliographic sources and analyze them.• Adhere to the principles of academic ethics, correctly citing the bibliographic sources used.• Show collaboration with other students and teaching staff in conducting educational activities.• Demonstrate receptiveness to new learning contexts.• Demonstrate autonomy in organizing the learning situation/context or the problem situation to be solved.• Collaborate with other colleagues and teachers in the conduct of teaching activities.• Apply principles of professional ethics/deontology in analyzing the technological impact of the proposed solutions in the field of specialization on the environment.• Demonstrate real-life situation management skills (time management, collaboration vs. conflict).
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8. Teaching methods

Based on the analysis of students' learning characteristics and their specific needs, the teaching process employs methods such as expository teaching (lectures, presentations), conversation-interactive approaches (discussions during office hours, presenting intermediate progress of semester projects), as well as action-based methods (problem-solving and discovery-based learning within homework assignments).

Teaching activities involve lectures based on PowerPoint presentations or various videos provided to students. Lectures focus on understanding the principles and techniques for data mining. Students are supported in practicing discovery-based learning by solving and then discussing homework assignments in class.

Active listening, presentation, explanation, and assertive communication skills of students are exercised through weekly office hours where students present progress in developing their project, discuss encountered issues, clarify necessary concepts through concrete examples related to their project. Hours dedicated to project discussions allow the pedagogical approach to be adapted to the learning needs of the students involved.

09. Content

LECTURE		
<i>Chapter</i>	<i>Content</i>	<i>no. of hours</i>
I	Introduction in Data Mining	2
II	Data Preprocessing	2
III	Association Rules and Sequential Patterns	2
IV	Supervised Learning – Part 1, 2, 3	4
V	Unsupervised Learning – Part 1, 2	4
VI	Semi Supervised Learning	4
VII	Web Usage Mining	4
VIII	Data Warehousing	2
IX	Dimensional Modeling	2
X	Dimensional Modeling – Case studies	2
Total:		28



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Bibliography:

1. Irina Mocanu, Data Minings, suport de curs electronic, <https://curs.upb.ro/2023/enrol/index.php?id=9777>
2. Mining Massive Data sets: <https://web.stanford.edu/class/cs246/>
3. Data Mining Tutorial : <https://www.mygreatlearning.com/blog/data-mining-tutorial/>
4. Mining of Massive Datasets, Jure Leskovec, Anand Rajaraman, Jeff Ullman, <http://www.mmds.org/>

SEMINARY/LABORATORY/ PROJECT

Chapter	Content	no. of hours
1.	Lab presentation and safety elements	2
2.	Data preprocessing	2
3.	Association rules and sequential patterns	2
4.	Supervised learning	4
5.	Unsupervised learning	4
6.	Semi supervised learning	4
7.	Web log analysis	4
8.	Data warehousing	2
9.	Dimensional Modelling	2
10.	Project defense	2
Total:		28

Bibliography:

1. Irina Mocanu, Data Minings, suport de curs electronic, <https://curs.upb.ro/2023/enrol/index.php?id=9777>
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3. Data Mining Tutorial : <https://www.mygreatlearning.com/blog/data-mining-tutorial/>
4. Mining of Massive Datasets, Jure Leskovec, Anand Rajaraman, Jeff Ullman, <http://www.mmds.org/>

10. Assessment

Activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Lecture	Correctness of problem solving	Written exam	40 points of 100
	Midterm exam	Written exam	20 points of 100
	Attendance and activity	Individual registration of attendance and activity (through online tests or attendance lists)	10 points of 100
10.5 Seminar / Laboratory / Project	Correctness of solving the project theme	Individual evaluation	30 points of 100



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10.6 Conditions for passing
Obtaining minimum 50% from each category.

Date

Course holder

Prof. dr. ing. Irina Mocanu

Applications holder

Prof. dr. ing. Irina Mocanu

Date of approval in
the department

Department director

Prof. dr. Emil Slusanschi

Date of approval in
the Faculty Council

Dean

Prof. dr. ing. Mihnea Moisescu