SYLLABUS

Programming Toolbox

University year 2025-2026

1. Information regarding the programme

1.1. Higher education institution	Babeş Bolyai University
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 for Industry and Society
1.7. Form of education	Full time

2. Information regarding the discipline

2.1. Name of the discipline	**Java technologies and platforms for distributed applications**					Discipline code	**MME8184**
2.2. Course coordinator				Lect. PhD. Ioan Bădărînză			
2.3. Seminar coordinator				Lect. PhD. Ioan Bădărînză			
2.4. Year of study	1	2.5. Semester	2	2.6. Type of evaluation	C	2.7. Discipline regime	Compulsory

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/project	**1 lab + 1 project**
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laboratory/project	**28**

Time allotment for individual study (ID) and self-study activities (SA)	**hours**
Learning using manual, course support, bibliography, course notes (SA)	40
Additional documentation (in libraries, on electronic platforms, field documentation)	30
Preparation for seminars/labs, homework, papers, portfolios and essays	40
Tutorship	19
Evaluations	14
Other activities:	1
3.7. Total individual study hours	**119**
3.8. Total hours per semester	**175**
3.9. Number of ECTS credits	**7**

4. Prerequisites (if necessary)

4.1. curriculum	Algorithms, data structures, statistics
4.2. competencies	Programming skills

5. Conditions (if necessary)

5.1. for the course	Classroom with video projector
5.2. for the seminar /lab activities	Laboratory room with video projector and computers

6.1. Specific competencies acquired [1]

Professional/essential competencies	• Acquire skills needed to transform large amounts of information into complex projects, by using a wide range of quantitative and qualitative methods. • Modeling and solving real-life problems in interdisciplinary teams with complementaries in knowledge
Transversal competencies	• Team work capabilities; able to fulfill different roles; • Professional communication skills; concise and precise description, both oral and written, of professional results , negociation abilities;

6.2. Learning outcomes

Knowledge	Knowledge of the tools needed to turn large amounts of raw data into relevant and useful business information.
Skills	Transforming the large volume of information into software applications by using quantitative and qualitative analysis techniques
Responsibility and autonomy:	Applying scientific and analytical methods of data analysis to solve problems in different fields, developing creative thinking about data and making decisions

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

7.1 General objective of the discipline	• Introduction to the most well-known tools available for data visualization and analysis, and the application of artificial intelligence algorithms for solving specific problems.
7.2 Specific objective of the discipline	• Installing and configuring the necessary software for the programming environment • Using various software tools for data analysis and visualization • Applying intelligent algorithms and presenting the results on a web page

[1] One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

8. Content

8.1 Course	Teaching methods	Remarks
Introduction (Course 1) Software projects life cycle	Interactive exposure Presentation Explanation Practical examples Case-study discussions	
Client – server architecture (Course 2 – 5) - Server-side Web technologies - Client-side Web technologies - Client – server integration		
Sklearn Presentation (Course 6 – 8) Types of problems solved with Sklearn		
Weka Presentation (Course 9 – 11) Types of problems solved with Weka		
SAS Platform Presentation (Course 12 – 14) - Platform Presentation (Course 12 – 14) - Administration and Architecture - Data analysis and visualization in the SAS platform - Smart features in the SAS platform		

Bibliography

Boian F. M. Programare distribuita √Æn Internet; metode si aplicatii. Editura Albastra, MicroInformatica, Cluj, 2005
Negrino T., Smith D. JavaScript for the World Wide Web. 4th edition, Visual QuickStart Guide, 2001
W3Schools Tutoriale Web Online, http://www.w3schools.com
Invatare supervizata, https://scikit-learn.org/stable/supervised_learning.html#supervised-learning
Invatare supervizata, https://www.cs.waikato.ac.nz/~ml/weka/
Suport SAS, https://support.sas.com/

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Servlet in Tomcat and Jetty containers: installations, configurations; demonstration of functionality using a simple servlet application	Conversation Algorithmization Problematisation Discovery Simulation Individual study Exercise	
2. EJB + JPA applications on AS GlassFish or WildFly: installation and configuration; demonstration of functionality		
3. Preparation and presentation of a report on a given topic (Java subject)		
4-7. Group project for a distributed application, with a majority implementation using Java technologies and frameworks, among others. (Group of 2-4)		

Bibliography

1. Boian F. M. Programare distribuita în Internet; metode si aplicatii. Editura Albastra, MicroInformatica, Cluj, 2005
2. Negrino T., Smith D. JavaScript for the World Wide Web. 4th edition, Visual QuickStart Guide, 2001
3. W3Schools Tutoriale Web Online, http://www.w3schools.com
4. Invatare supervizata, https://scikit-learn.org/stable/supervised_learning.html#supervised-learning
5. Invatare supervizata, https://www.cs.waikato.ac.nz/~ml/weka/
6. Suport SAS, https://support.sas.com

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 course is included in the curricula of many specialized universities around the world
- Software companies consider the course content valuable for developing students' modeling and programming skills

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	- Understanding the basic concepts of the field - Applying the principles covered in the course to solve problems	Project	50%
10.5 Seminar/laboratory	- Ability to understand and use the presented tools - Solving data visualization problems and using artificial intelligence algorithms	Systematic observation of the student during the task	10%
		Projects	40%
10.6 Minimum standard of performance			
• Each student must demonstrate that they understand how to install, configure, and use the tools presented during lectures and labs. They should also be able to identify the appropriate tool for solving specific problems. • To pass this course, the student must obtain at least a grade of 5 for the final project and an average of at least 5 for the seminar projects.			

11. Labels ODD (Sustainable Development Goals)[2]

Not applicable.

Date:
...

Signature of course coordinator

Lect. PhD. Ioan Bădărînză

Signature of seminar coordinator

Lect. PhD. Ioan Bădărînză

Date of approval:
...

Signature of the head of department

Assoc.prof.phd. Adrian STERCA

[2] Keep only the labels that, according to the *Procedure for applying ODD labels in the academic process*, suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable.*".