SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babes-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	**Bachelor**
1.6 Study programme / Qualification	**Computer Science**

2. Information regarding the discipline

2.1 Name of the discipline	**Robotic Process Automation (Automatizarea proceselor de business)**						
2.2 Course coordinator	**Lecturer PhD Andreea-Diana Pop**						
2.3 Seminar coordinator	**Lecturer PhD Andreea-Diana Pop**						
2.4. Year of study	**3**	2.5 Semester	**5**	2.6. Type of evaluation	**C**	2.7 Type of discipline	**Optional**
2.8 Discipline Code	**MLE5147**						

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

3.1 Hours per week	3	Of which: 3.2 course	2	3.3 seminar/laboratory	1 lab + 2 project
3.4 Total hours in the curriculum	42	Of which: 3.5 course	28	3.6 seminar/laboratory	14

Time allotment:	Hours
Learning using manual, course support, bibliography, course notes	10
Additional documentation (in libraries, on electronic platforms, field documentation)	15
Preparation for seminars/labs, homework, papers, portfolios and essays	20
Tutorship	6
Evaluations	7
Other activities:	-

3.7 Total individual study hours	58
3.8 Total hours per semester	100
3.9 Number of ECTS credits	4

4. Prerequisites (if necessary)

4.1. curriculum	• OOP, Programming Fundamentals, Advanced Programming Methods
4.2. competencies	• Good programming skills in at least one of the programming languages Java, C#

5. Conditions (if necessary)

5.1. for the course	• Course hall with projector
5.2. for the seminar /lab activities	• Laboratory: computers and use of a programming language environment

6. Specific competencies acquired

Professional competencies	• **C2.1** Identify adequate software systems development methodologies • **C4.3** Identify models and methods adequate to real life problem solving.
Transversal competencies	• **CT1** Apply rules to organized and efficient work, responsibilities of didactical and scientific activities and creative capitalization of own potential, while respecting principles and rules for professional ethics. • **CT3** Use efficient methods and techniques for learning, knowledge gaining, and research and develop capabilities for capitalization of knowledge, accommodation to society requirements and communication in English.

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

7.1 General objective of the discipline	• Enhance the students understanding on business process identification and its automation. • Provide the students with an environment in which they can explore the usage and usefulness of software development to increase efficiency in business processes. • Induce a realistic and industry driven view of software development for business process automation related concepts and their inherent benefits.
7.2 Specific objective of the discipline	• Give students the ability to explore various ways to automate business processes. • Improve the students' abilities to tackle on goal driven process automation. • Enhance the students understanding of process automation value in business. • Students will be able to use various tools, e.g., UiPath Studio, in order to provide a process automation solution. • Students will be able to design and develop a business process automation solution following specific requirements and real world case studies available on RPA learning platforms.

8. Content

8.1 Course	Teaching methods	Remarks
1. Robotic Process Automation (RPA) 1.1. **Business Process Identification** 1.2. **Introduction to UiPath Studio** 1.2.1. Basics concepts 1.2.2. UiPath Platform Architecture	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
2. Data manipulation 2.1. Variables. Data types 2.2. Control flow structures 2.3. Scalar variables. Collections. Tables 2.4. Text manipulation	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
3. User Events. Recorder 3.1. **User Events** 3.2. **Recorder** 3.2.1. Basic recording 3.2.2. Desktop recording 3.2.3. Web recording	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
4. Advanced UI Interaction 4.1. Input/output methods 4.2. Screen scraping	• Interactive exposure • Explanation. Conversation • Didactical demonstration	

4.3. Data scraping		
5. Selectors 5.1. Definition and access 5.2. Customization and debugging 5.3. Dynamic selectors	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
6. Image and Text Automation 6.1. Keyboard Automation 6.2. Information Retrieval	• Interactive exposure • Explanation • Conversation • Didactical demonstration	
7. Excel. Data Tables 7.1. Basic Interactions 7.2. Data Processing	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
8. PDF Automation 8.1. Data Extraction 8.2. Anchor base Activity	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
9. E-mail Automation 9.1. E-mail interaction 9.2. E-mail sending	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
10. Orchestrator 10.1.Basic Features 10.2.Jobs. Scheduler 10.3.Assets. Queues	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
11. Debugging and Exception Handling 11.1.UiPath debugging tools 11.2.Input issues 11.3.Error catching	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
12. Robotic Enterprise Framework 12.1.ReFramework Architecture 12.2.Examples	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
13. Testing. Deployment 13.1.Testing the RPA Solution 13.2.Deploying an RPA Solution	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
14. RPA Security Related Topics 14.1.Security Challenges 14.2.IDE Security 14.3.Robot Security 14.4.Orchestrator Security	• Interactive exposure • Explanation. Conversation • Didactical demonstration	

Bibliography

1. Institute for RPA (2015), An Introduction to RPA. A primer, http://irpaai.com/wp-content/uploads/2015/05/Robotic-Process-Automation-June2015.pdf
2. Steve Kaelble (2018), RPA, https://www.icsanalytics.com/wp-content/uploads/2019/02/robotic_process_automation_for_dummies.pdf
3. KPMG (2018), RPA, https://home.kpmg/content/dam/kpmg/jp/pdf/jp-en-rpa-business-improvement.pdf
4. Tom Taulli (2020), The robotic Process Automation Handbook. A guide to implementing RPA systems, Apress, https://link.springer.com/book/10.1007/978-1-4842-5729-6
5. Guðrún Lilja Sigurðardóttir (2018), Robotic Process Automation - Dynamic Roadmap for Successful Implementation, master thesis.
6. UiPath, https://www.uipath.com/developers/video-tutorials
7. UiPath Studio Docs (2023) - https://docs.uipath.com/studio/docs/release-notes-2022-10-3
8. UiPath Academy - https://academy.uipath.com/

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Laboratory 1 UiPath Studio installation	Presentation, Conversation, Dialogue, Case studies	

RPA project setup		
2. Laboratory 2 Sequences. Flowcharts	Presentation, Conversation, Dialogue, Case studies	
3. Laboratory 3 Custom activities. Data processing	Presentation, Conversation, Dialogue, Case studies	
4. Laboratory 4 Excel Automation	Presentation, Conversation, Dialogue, Case studies	
5. Laboratory 5 PDFs Automation	Presentation, Conversation, Dialogue, Case studies	
6. Laboratory 6 E-mail Automation	Presentation, Conversation, Dialogue, Case studies	
7. Laboratory 7 Project turn-in/Demo	Evaluation	
References: See references from Lectures.		

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 exists in the studying program of all major universities abroad.
- The content of the course is considered relevant by the software companies that design and implement automation solutions for business processes.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Seminar/laboratory activities	**Three out of six lab activities** will be graded. The arithmetic average of the grades is denoted by **L**.	Laboratory Activity	30%
10.5 Project	Design and develop a solution for business process automation in UiPath Studio. The grade is denoted by **P**.	Project grading	70%
Remark: • The automation process project will pe achieved in groups of 2-3 students.			
10.6 Minimum performance standards			
• The final grade (M) is computed as follows: M = 30%L+70%P. • At least M >= 5.00 is favourable to pass this course exam. • Students will be able to design and develop an automation solution for a repetitive business process, considering an identified flow. • Students will be able to use the components of the UiPath platform and to use them properly.			

Date	Signature of course coordinator	Signature of seminar coordinator
April 1 2024	**Lect. PhD. Andreea-Diana Pop,**	**Lect. PhD. Andreea-Diana Pop,**
	Andreea-Diana Pop Digitally signed by Andreea-Diana Pop Date: 2024.04.01 03:41:59 +03'00'	Andreea-Diana Pop Digitally signed by Andreea-Diana Pop Date: 2024.04.01 03:42:28 +03'00'
Date of approval		Signature of the head of department
.....		**Conf. PhD. Adrian Sterca**