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	**Mathematics and Computer Science (in English)**

2. Information regarding the discipline

2.1 Name of the discipline	**Robotic Process Automation (Automatizarea proceselor de business)**						
2.2 Course coordinator		**Lecturer PhD Camelia Chisăliţă-Creţu**					
2.3 Seminar coordinator		**Lecturer PhD Camelia Chisăliţă-Creţu**					
2.4. Year of study	**3**	2.5 Semester	**5**	2.6. Type of evaluation	**VP**	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	4	Of which: 3.2 course	2	3.3 seminar/laboratory		1 lab + 1 project
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	30
Additional documentation (in libraries, on electronic platforms, field documentation)	30
Preparation for seminars/labs, homework, papers, portfolios and essays	30
Tutorship	9
Evaluations	20
Other activities:	-

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	• 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. Basics concepts
  1.2. UiPath Platform Architecture
	• Interactive exposure
	• Explanation. Conversation
	• Didactical demonstration	

2. Business Process
  2.1. **Business Process Identification**
  2.2. **Introduction to UiPath Studio**
    2.2.1. Variables. Data types
    2.2.2. Control flow structures
	• Interactive exposure
	• Explanation. Conversation
	• Didactical demonstration	

3. Data processing
  3.1. **Operations on Data**
    3.1.1. Entry. Update. Validation
    3.1.2. Migration
  3.2. **Data manipulation**
    3.2.1. Scalar variables. Collections. Tables
    3.2.2. Text manipulation
    3.2.3. Gathering and assembling data
	• Interactive exposure
	• Explanation. Conversation
	• Didactical demonstration	

4. User Events. Recorder
4.1. **User Events**
4.2. **Recorder**
    4.2.1. Desktop recording
    4.2.2. Web recording
	• Interactive exposure
	• Explanation. Conversation
	• Didactical demonstration	

5. Advanced UI Interaction 5.1. Input/output methods 5.2. Screen scraping 5.3. Data scraping	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
6. Selectors 6.1. Definition and access 6.2. Customization and debugging 6.3. Dynamic selectors	• Interactive exposure • Explanation • Conversation • Didactical demonstration	

7. Image and Test Automation
7.1. Basic Citrix Automation
    7.1.1. Keyboard Automation
    7.1.2. Information Retrieval
7.2. Advanced Citrix Automation
    7.2.1. Best Practice Rules
    7.2.2. Starting Applications
	• Interactive exposure
	• Explanation. Conversation
	• Didactical demonstration	

8. Excel. Data Tables 8.1. Basic Interactions 8.2. Data Process	• Interactive exposure • Explanation. Conversation • Didactical demonstration	

9. PDF and E-mail
9.1. **PDF**
    9.1.1. Data Extraction
    9.1.2. Anchor base Activity
9.2. **E-mail Automation**
    9.2.1. E-mail interaction
    9.2.2. E-mail sending
	• Interactive exposure
	• Explanation. Conversation
	• Didactical demonstration	

10. Debugging and Exception Handling 10.1.UiPath debugging tools 10.2.Input issues 10.3.Error catching	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
11. Orchestrator 11.1.Basics. Features 11.2.Jobs scheduler 11.3.Queues	• Interactive exposure • Explanation. Conversation • Didactical demonstration	
12. Project Organization 12.1.Best practices 12.2.Invoke Command 12.3.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. Final considerations 14.1.ROI with RPA 14.2.Emerging and Future Trends in RPA	• Interactive exposure • Explanation. Conversation • Didactical demonstration	

Bibliography

Institute for RPA, An Introduction to RPA. A primer, http://irpaai.com/wp-content/uploads/2015/05/Robotic-Process-Automation-June2015.pdf

Steve Kaelble, RPA, https://www.nice.com/websites/rpa/assets/robotic_process_automation_for_dummies.pdf

KPMG, RPA, https://home.kpmg/content/dam/kpmg/jp/pdf/jp-en-rpa-business-improvement.pdf

Assurity, Introduction to RPA, https://assurity.nz/assets/290a244552/An-Introduction-to-RPA.pdf

UiPath, https://www.uipath.com/developers/video-tutorials		
8.2 Seminar / laboratory	**Teaching methods**	**Remarks**
1. Laboratory 1 UiPath Studio installation RPA project setup	Presentation, Conversation, Dialogue, Case studies	
2. Laboratory 2 Repetitive business process identification Automation plan	Presentation, Conversation, Dialogue, Case studies	
3. Laboratory 3 Project input Data processing	Presentation, Conversation, Dialogue, Case studies	
4. Laboratory 4 UI interaction	Presentation, Conversation, Dialogue, Case studies	
5. Laboratory 5 Image and Text Automation	Presentation, Conversation, Dialogue, Case studies	
6. Laboratory 6 PDFs and E-mail Automation Project output. Project outcome	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

- Students will know how to design and develop an automation solution for a repetitive business process, considering an identified flow.
- Students will know the components of the UiPath platform and to use them properly.

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.			

Date	Signature of course coordinator	Signature of seminar coordinator
30.04.2019	**Lect. PhD. Camelia Chisăliţă-Creţu,**	**Lect. PhD. Camelia Chisăliţă-Creţu,**

Date of approval   Signature of the head of department

Prof. PhD. Anca Andreica