

## SYLLABUS

### 1. Information regarding the programme

1.1 Higher education institution	<b>Babes-Bolyai University</b>
1.2 Faculty	<b>Faculty of Mathematics and Computer Science</b>
1.3 Department	<b>Department of Computer Science</b>
1.4 Field of study	<b>Computer Science</b>
1.5 Study cycle	<b>Bachelor</b>
1.6 Study programme / Qualification	<b>Computer Science (in English)</b>

### 2. Information regarding the discipline

2.1 Name of the discipline	<b>Robotic Process Automation (Automatizarea proceselor de business)</b>						
2.2 Course coordinator	<b>Lecturer PhD Camelia Chisăliță-Crețu</b>						
2.3 Seminar coordinator	<b>Lecturer PhD Camelia Chisăliță-Crețu</b>						
2.4. Year of study	<b>3</b>	2.5 Semester	<b>5</b>	2.6. Type of evaluation	<b>C</b>	2.7 Type of discipline	<b>Optional</b>
2.8 Discipline Code	<b>MLE5147</b>						

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

3.1 Hours per week	5	Of which: 3.2 course	2	3.3 seminar/laboratory	1 lab + 2 project
3.4 Total hours in the curriculum	70	Of which: 3.5 course	28	3.6 seminar/laboratory	42
Time allotment:					Hours
Learning using manual, course support, bibliography, course notes					5
Additional documentation (in libraries, on electronic platforms, field documentation)					5
Preparation for seminars/labs, homework, papers, portfolios and essays					5
Tutorship					5
Evaluations					10
Other activities: .....					-
3.7 Total individual study hours	30				
3.8 Total hours per semester	100				
3.9 Number of ECTS credits	4				

### 4. Prerequisites (if necessary)

4.1. curriculum	<ul style="list-style-type: none"> <li>• OOP, Programming Fundamentals, Advanced Programming Methods</li> </ul>
4.2. competencies	<ul style="list-style-type: none"> <li>• Good programming skills in at least one of the programming languages Java, C#</li> </ul>

### 5. Conditions (if necessary)

5.1. for the course	<ul style="list-style-type: none"> <li>• Course hall with projector</li> </ul>
5.2. for the seminar /lab activities	<ul style="list-style-type: none"> <li>• Laboratory: computers and use of a programming language environment</li> </ul>

## 6. Specific competencies acquired

<b>Professional competencies</b>	<ul style="list-style-type: none"> <li>• <b>C2.1</b> Identify adequate software systems development methodologies</li> <li>• <b>C4.3</b> Identify models and methods adequate to real life problem solving.</li> </ul>
<b>Transversal competencies</b>	<ul style="list-style-type: none"> <li>• <b>CT1</b> 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.</li> <li>• <b>CT3</b> 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.</li> </ul>

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

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>• Enhance the students understanding on business process identification and its automation.</li> <li>• Provide the students with an environment in which they can explore the usage and usefulness of software development to increase efficiency in business processes.</li> <li>• Induce a realistic and industry driven view of software development for business process automation related concepts and their inherent benefits.</li> </ul>
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> <li>• Give students the ability to explore various ways to automate business processes.</li> <li>• Improve the students' abilities to tackle on goal driven process automation.</li> <li>• Enhance the students understanding of process automation value in business.</li> <li>• Students will be able to use various tools, e.g., UiPath Studio, in order to provide a process automation solution.</li> <li>• 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.</li> </ul>

## 8. Content

8.1 Course	Teaching methods	Remarks
<b>1. Robotic Process Automation (RPA)</b> 1.1. Basics concepts 1.2. UiPath Platform Architecture	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>2. Business Process</b> 2.1. <b>Business Process Identification</b> 2.2. <b>Introduction to UiPath Studio</b> 2.2.1. Variables. Data types 2.2.2. Control flow structures	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>3. Data processing</b> 3.1. <b>Operations on Data</b> 3.1.1. Entry. Update. Validation 3.1.2. Migration 3.2. <b>Data manipulation</b> 3.2.1. Scalar variables. Collections. Tables 3.2.2. Text manipulation 3.2.3. Gathering and assembling data	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	

<b>4. User Events. Recorder</b> 4.1. User Events 4.2. Recorder 4.2.1. Desktop recording 4.2.2. Web recording	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>5. Advanced UI Interaction</b> 5.1. Input/output methods 5.2. Screen scraping 5.3. Data scraping	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>6. Selectors</b> 6.1. Definition and access 6.2. Customization and debugging 6.3. Dynamic selectors	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation</li> <li>• Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>7. Image and Test Automation</b> 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	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>8. Excel. Data Tables</b> 8.1. Basic Interactions 8.2. Data Process	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>9. PDF and E-mail</b> 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	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>10. Debugging and Exception Handling</b> 10.1.UiPath debugging tools 10.2.Input issues 10.3.Error catching	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>11. Orchestrator</b> 11.1.Basics. Features 11.2.Jobs scheduler 11.3.Queues	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>12. Project Organization</b> 12.1.Best practices 12.2.Invoke Command 12.3.Examples	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>13. Testing. Deployment</b> 13.1.Testing the RPA Solution 13.2.Deploying an RPA Solution	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	
<b>14. Final considerations</b> 14.1.ROI with RPA 14.2.Emerging and Future Trends in RPA	<ul style="list-style-type: none"> <li>• Interactive exposure</li> <li>• Explanation. Conversation</li> <li>• Didactical demonstration</li> </ul>	

## 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](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, <a href="https://www.uipath.com/developers/video-tutorials">https://www.uipath.com/developers/video-tutorials</a>		
8.2 Seminar / laboratory	Teaching methods	Remarks
<b>1. Laboratory 1</b> UiPath Studio installation RPA project setup	Presentation, Conversation, Dialogue, Case studies	
<b>2. Laboratory 2</b> Repetitive business process identification Automation plan	Presentation, Conversation, Dialogue, Case studies	
<b>3. Laboratory 3</b> Project input Data processing	Presentation, Conversation, Dialogue, Case studies	
<b>4. Laboratory 4</b> UI interaction	Presentation, Conversation, Dialogue, Case studies	
<b>5. Laboratory 5</b> Image and Text Automation	Presentation, Conversation, Dialogue, Case studies	
<b>6. Laboratory 6</b> PDFs and E-mail Automation Project output. Project outcome	Presentation, Conversation, Dialogue, Case studies	
<b>7. Laboratory 7</b> Project turn-in/Demo	Evaluation	
<b>References:</b> 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

<ul style="list-style-type: none"> <li>• Students will know how to design and develop an automation solution for a repetitive business process, considering an identified flow.</li> <li>• Students will know the components of the UiPath platform and to use them properly.</li> </ul>
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### 10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Seminar/laboratory activities	<b>Three out of six lab activities</b> will be graded. The arithmetic average of the grades is denoted by <b>L</b> .	Laboratory Activity	30%
10.5 Project	Design and develop a solution for business process automation in UiPath Studio. The grade is denoted by <b>P</b> .	Project grading	70%
<b>Remark:</b>			
<ul style="list-style-type: none"> <li>• The automation process project will be achieved in groups of 2-3 students.</li> </ul>			
10.6 Minimum performance standards			
<ul style="list-style-type: none"> <li>• The final grade (M) is computed as follows: <math>M = 30\%L + 70\%P</math>.</li> <li>• At least <math>M \geq 5.00</math> is favourable to pass this course exam.</li> </ul>			

Date

Signature of course coordinator

Signature of seminar coordinator

30.04.2019

Lect. PhD. Camelia Chisăliță-Crețu,

Lect. PhD. Camelia Chisăliță-Crețu,

Date of approval

Signature of the head of department

Prof. PhD. Anca Andreica