

## SYLLABUS

### 1. Information regarding the programme

1.1 Higher education institution	<b>Babeş-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>Computers and Information Technology</b>
1.5 Study cycle	<b>Bachelor</b>
1.6 Study programme / Qualification	<b>Information Engineering</b>

### 2. Information regarding the discipline

2.1 Name of the discipline (en) (ro)	Affective Computing Calcul Afectiv						
2.2 Course coordinator	Lector dr.ing. Bența Kuderna-Iulian						
2.3 Seminar coordinator	Lector dr.ing. Bența Kuderna-Iulian						
2.4. Year of study	<b>4</b>	2.5 Semester	<b>7</b>	2.6. Type of evaluation	<b>C</b>	2.7 Type of discipline	<b>Optional DS</b>
2.8 Code of the discipline	MLE5150						

### 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 LP
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)					10
Preparation for seminars/labs, homework, papers, portfolios and essays					14
Tutorship					8
Evaluations					16
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	<ul style="list-style-type: none"> <li>Algorithms, Data structures</li> </ul>
4.2. competencies	<ul style="list-style-type: none"> <li>High level programming language (OOP) skills</li> </ul>

## 5. Conditions (if necessary)

5.1. for the course	<ul style="list-style-type: none"> <li>• A room with Internet access and presentation devices</li> </ul>
5.2. for the seminar /lab activities	<ul style="list-style-type: none"> <li>• A room with computers (with up to date processing power, minimum 8 GB RAM) and high-speed Internet access</li> </ul>

## 6. Specific competencies acquired

<b>Professional competencies</b>	<p>C3.1 Description of concepts, theories and models used in the application domain</p> <p>C3.2 Identification and explanation of basic informatic models for the application domain</p> <p>C3.3 Use of informatic and mathematical models and tools to solve domain specific problems</p> <p>C3.4 Data and model analysis</p> <p>C3.5 Design and development of software components for interdisciplinary projects</p>
<b>Transversal competencies</b>	<p>CT1 Honorable, responsible, ethical behavior, in the spirit of the law, to ensure the professional reputation</p> <p>CT2 Identifying, describing and conducting processes in the projects management field, undertaking different team roles and clearly and concisely describing own profesional results, verbally or in writing</p> <p>CT3 Demonstrating initiative and pro-active behavior for updating professional, economical and organizational culture knowledge</p>

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

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>• Developing the ability to analyze, design and implement user's affective states adapted applications</li> </ul>
7.2 Specific objective of the discipline	<ul style="list-style-type: none"> <li>• Acquaintance with signals and algorithms for mono, bi and multimodal affective states</li> <li>• Skills to develop complex modular applications with signal processing, feature extraction and machine learning</li> </ul>

## 8. Content

8.1 Course	Teaching methods	Remarks
1. Introduction to Affective Computing (examples, historical facts, definitions)	Presentation, interactive lecture, discussions, case studies, problem solving	1 lecture / week
2. Affect Models (Russell, activation-valence, OCC, appraisal)		
3. Affective States Representation (discrete, dimensional, fuzzy; measures in modelling)		
4. Facial Expression Recognition (models,		

approaches, model fusion, deep learning)		
5. Voice-based Affective States Assessment (feature extraction, pattern recognition)		
6. Physiological Affective States Detection (feature extraction, pattern recognition)		
7. Affective States Assessment from Other Communication Channels (kinesthetic-postural, contextual, text content)		
8. Multimodal Affective States Detection (sensor fusion, computing infrastructure)		
9. Presentation and discussion of the Theoretical Projects		
10. Ethical Aspects in Affective Computing		
11. Presentation and discussion of the Practical Projects (I)		
12. Presentation and discussion of the Practical Projects (II)		
13. Research Challenges in Affective Computing (II)		
14. Research Challenges in Affective Computing (II)		
Bibliography		
1. Emotionale Intelligenz erhöhen: Emotionen wahrnehmen, verstehen und ausdrücken, by Casten Voller, ISBN-13: 978-1521902776, ISBN-10: 1521902771, 2017		
2. Mensch und Maschine: Wie künstliche Intelligenz und Roboter unser Leben verändern, by Thomas Ramge (Author), Dinara Galieva (Illustrator), ISBN-13: 978-3150194997, ISBN-10: 3150194997, 2018		
3. The Oxford Handbook of Affective Computing (Oxford Library of Psychology) 1st Edition, by Rafael A. Calvo (Editor), Sidney D'Mello (Editor), Jonathan Gratch (Editor), Arvid Kappas (Editor), ISBN-13: 978-0199942237, ISBN-10: 9780199942237, 2014		
4. Emotions and Affect in Human Factors and Human-Computer Interaction, by Myounghoon Jeon (Editor), ISBN-13: 978-0128018514, ISBN-10: 0128018518, 2017.		
5. Deep Learning. Das umfassende Handbuch: Grundlagen, aktuelle Verfahren und Algorithmen, neue Forschungsansätze, Ian Goodfellow, Yoshua Bengio, Aaron Courville, mitp Professional, 2018		
8.2 Seminar / laboratory	Teaching methods	Remarks
1. Project themes presentation. Project analysis and design phase.	Explanations, Demonstrations, Discussion, Brainstorming, Case studies, Collaboration	
2. Hands-on experience with available Affective Computing solutions		
3. Designing and implementing a simple Facial Expression Recognition System		
4. Designing and implementing a bimodal Affective State Assessment System		
5. Using Mobile and Wearable Devices for Affective Computing		
6. Development and refinement of the Practical Projects (I)		
7. Development and refinement of the Practical		

Projects (II)		
<b>Bibliography</b>		
1. Emotionale Intelligenz erhöhen: Emotionen wahrnehmen, verstehen und ausdrücken, by Casten Voller, ISBN-13: 978-1521902776, ISBN-10: 1521902771, 2017		
2. Mensch und Maschine: Wie künstliche Intelligenz und Roboter unser Leben verändern, by Thomas Ramge (Author), Dinara Galieva (Illustrator), ISBN-13: 978-3150194997, ISBN-10: 3150194997, 2018		
3. The Oxford Handbook of Affective Computing (Oxford Library of Psychology) 1st Edition, by Rafael A. Calvo (Editor), Sidney D'Mello (Editor), Jonathan Gratch (Editor), Arvid Kappas (Editor), ISBN-13: 978-0199942237, ISBN-10: 9780199942237, 2014		
4. Emotions and Affect in Human Factors and Human-Computer Interaction, by Myounghoon Jeon (Editor), ISBN-13: 978-0128018514, ISBN-10: 0128018518, 2017.		
5. Deep Learning. Das umfassende Handbuch: Grundlagen, aktuelle Verfahren und Algorithmen, neue Forschungsansätze, Ian Goodfellow, Yoshua Bengio, Aaron Courville, mitp Professional, 2018		

**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>• The curriculum of this course aligns to the guidelines of ACM and IEEE</li> <li>• The software organisations recognize the importance of the concepts discussed during this course for the development of functional, user-friendly and intelligent products.</li> </ul>
---

**10. Evaluation**

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Basic knowledge of the Affective Computing domain	Theoretical Projects Presentation	30%
	Operationalization of the principles and technologies to design and develop affective states assessment applications		
10.5 Seminar/lab activities	Analyze, Design, Implementation and Testing affective states assessment applications	Practical Projects Presentation	50%
		Systematical observation of the student through the laboratory activities	20%
10.6 Minimum performance standards			
<ul style="list-style-type: none"> <li>➤ Each student should demonstrate that he/she reached an acceptable level of knowledge and understanding of the Affective Computing domain, that she/he is able to express the knowledge in a coherent form and that is able to practically apply those in order to solve real world problems for the user benefit in an ethical manner.</li> <li>➤ It is necessary to obtain a minimum grade of 5 (average of Course and Laboratory) and to demonstrate a minimal but functional and original affective assessment application in order to pass</li> </ul>			

this discipline.

Date

Mai 2022

Signature of course coordinator

  
.....

Signature of seminar coordinator

  
.....

Date of approval

24.05.2022

Signature of the head of department

Prof. dr. Laura Dioşan

