COURSE OUTLINE

1. General Information

University	Transilvania University of Braşov
Faculty	Mathematics and Computer Science
University degree field	Computer Science
Study Programme	**TIN**
Course name	Cloud and Grid Computing

2. Course information

2.1 Name	**Cloud and Grid Computing**							
2.2 Lecturer				Răzvan BOCU				
2.3 Laboratory activities				Răzvan BOCU				
2.4 Year of study	2	2.5 Semester	3	2.6 Assessment type	E	2.7 Course status	Content[2)]	DCA
							Compulsory[3)]	DI

3. Total estimated time

3.1 Hours per week	**3**	Of which: 3.2 course	**2**	3.3 laboratory	**0/1/0**
3.4 Total number of hours	**42**	Of which: 3.5 practicals	**28**	3.6 project	**14**
Time distribution					hours
Individual study					**158**

3.7 Total number of hours	**158**
3.8 Total hours per semester	**200**
3.9 Numbers of credits[4)]	**8**

4. Prerequisites

4.1 curriculum	• Basic concepts regarding the cloud programming.
4.2 competences	• The efficient administration and programming concerning the Cloud infrastructures.

5. Conditions

5.1 course	• The necessary logistics regarding the presentation and programming activities.
5.2 seminar/ laboratory/ project	• A *nix or Windows distribution installed on the workstations, and a minimum of one mobile device.

6. Specific competences

Professional Competences	**CP. 1. Specification, design, and development of software systems using procedural languages, object-oriented languages, declarative languages, databases, methodologies, and development platforms** RÎ. 1.2. The graduate can situate a problem within a studied theoretical framework. RÎ. 1.3. The graduate can apply modern programming methods and techniques to solve a wide range of problems. RÎ. 1.4. The graduate can provide demonstrations and explanations regarding the validity of the claimed computational results. RÎ. 1.5. The graduate can apply IT methods and techniques to solve practical problems. RÎ. 1.7. The graduate can analyse algorithms that lead to solving practical problems. RÎ. 1.8. The graduate can perform quantitative evaluations of solutions using Data Mining. **CP. 3. Deepening methodologies and cutting-edge technologies used in the software industry or with clear prospects of being used in the near future** RÎ. 3.3. The graduate is capable of making interconnections between different IT fields. RÎ. 3.5. The graduate can situate a problem within a studied theoretical framework. RÎ. 3.6. The graduate can apply modern IT methods and techniques to solve a wide range of problems. **CP.4 Establishing data processes, managing data collection systems, developing data processing applications, implementing data quality processes, extracting information from data** RÎ. 4.2. The graduate develops and manages methods and strategies to maximize data quality and statistical efficiency in data collection, ensuring the collected data is optimized for subsequent processing. RÎ. 4.4. The graduate applies techniques for data analysis, validation, and quality verification to ensure data integrity. RÎ. 4.5. The graduate explores large datasets to reveal patterns using statistics, database systems, or artificial intelligence and presents the information in an easily understandable manner.
Transversal Competences	**CT. 1. Communication and cooperation in professional contexts** RÎ. 1.2. The graduate uses communication and relationship techniques in the virtual environment. RÎ. 1.3. The graduate is capable of cooperating and integrating into professional work teams in the educational field and interdisciplinary teams. RÎ. 1.5. The graduate can deliver public presentations and communications to promote knowledge and professional values. **CT. 2. Career development and management** RÎ. 2.2. The graduate formulates objectives for career development and identifies strategies for action in this regard. RÎ. 2.3. The graduate self-evaluates and reflects on their own career, identifying strategies for adjustment and overcoming professional challenges.

7. Course objectives

7.1 General objective	• Building the abilities concerning the cloud applications development.
7.2 Obiectivele specifice	• The methodologic development of applications for cloud infrastructures. • The development of cross-platform cloud applications. • The development of resource-efficient applications for virtualized cloud containers.

8. Course content

8.1 Course	Teaching methods	Remarks
1. Introductory concepts	Presentation, explanation	2
2. Fundamental laws. Parallel computing.	Presentation, explanation	2
3. Introduction to cloud computing, typologies.	Presentation, explanation	2
4. Amazon Web Services. Google Compute Engine. HP Cloud Compute.	Presentation, explanation	2
5. IBM Smart Cloud Enterprise. Amazon S3. Google Cloud Storage. Host Europe Cloud Storage.	Presentation, explanation	2
6. Google App Engine. AWS Elastic Beanstalk.	Presentation, explanation	4
7. Private Cloud Infrastructure Services. Private platform services.	Presentation, explanation	2
8. Cluster computing.	Presentation, explanation	4
9. Grid computing.	Presentation, explanation	2
10. Peer to peer and Cloud Computing.	Presentation, explanation	2

11. MapReduce/Hadoop.	Presentation, explanation	2
12. Service Oriented Architectures. Web services.	Presentation, explanation	2

8.2 Laboratory
1. Comparison between the technological approaches – two hours
2. Modalities for data storage – two hours
3. Architectural approaches. Perspectives – two hours
4. AWS – four hours
5. Persistent storage – two hours
6. Persistent storage 2 – four hours
7. Google App Engine – four hours
8. Private Cloud – two hours
9. MPI – four hours
10. Cluster Computing – two hours

9. Correlation of course content with the demands of the labour market (epistemic communities, professional associations, potential employers in the field of study)

The course syllabus has been elaborated considering the specific requirements of academic and industry partners.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of the final grade
10.4 Course	The specific konwledge regarding the Cloud computing technologies and the related programming tools	The final assessment through a scientfic presentation, which is illustrated in the context of a cloud software system.	50%
10.5 Seminar/ laboratory/ project	The accumulation of the competences enivisaged by the course content	The continuous and formative evaluation through specific projects and activities.	50%
10.6 Minimal performance standard Laboratory: The approach of the essential laboratory assessments. Course: The eloquent presentation of the allocated topic, which is illustrated through an adequate cloud-based system.			

This document has been approved by the Departmental council on 26/09/2024, and also by the Faculty council on 26/09/2024.

Dean Conf. Dr. Ion Gabriel Stan	Department director Conf. Dr. Nicușor Minculete
Course convenor Conf. Dr. Bocu Răzvan	Laboratory/project convenor Conf. Dr. Bocu Răzvan

Note:

1) Field of study – select one of the following options: BA/MA/PhD. (to be filled in according to the forceful classification list for study programmes);

2) Study level – choose from among: BA/MA/PhD;

3) Course status (content) – for the BA level, select one of the following options: FC (fundamental course) / DC (course in the study domain)/ SC (speciality course)/ CC (complementary course); for the MA level, select one of the following options: PC (proficiency course)/ SC (synthesis course)/ AC (advanced course);

4) Course status (attendance type) – select one of the following options: CPC (compulsory course)/ EC (elective course)/ NCPC (non-compulsory course);

5) One credit is the equivalent of 25 – 30 study hours (teaching activities and individual study).