SYLLABUS

Internship in Specialization

University year 2025-2026

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	**Informatics(Computer Science)**	
1.5. Study cycle	**Master**	
1.6. Study programme/Qualification	**High Performance Computing and Big Data Analytics**	
1.7. Form of education	**Full time**	

2. Information regarding the discipline

2.1. Name of the discipline						Discipline code	**MME9012**
2.2. Course coordinator				**Assoc.Prof.PhD. Niculescu Virginia**			
2.3. Seminar coordinator				**Assoc.Prof.PhD. Niculescu Virginia**			
2.4. Year of study	2	2.5. Semester	4	2.6. Type of evaluation	**C**	2.7. Discipline regime	**Compulsory**

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

3.1. Hours per week	16	of which: 3.2 course	**0**	3.3 seminar/laboratory/project	**16**
3.4. Total hours in the curriculum	192	of which: 3.5 course	0	3.6 seminar/laboratory/project	**192**
Time allotment for individual study (ID) and self-study activities (SA)					**hours**
Learning using manual, course support, bibliography, course notes (SA)					76
Additional documentation (in libraries, on electronic platforms, field documentation)					76
Preparation for seminars/labs, homework, papers, portfolios and essays					60
Tutorship					56
Evaluations					20
Comunicare bidirecțională cu tutorele					20
3.7. Total individual study hours	308				
3.8. Total hours per semester	500				
3.9. Number of ECTS credits	20				

4. Prerequisites (if necessary)

4.1. curriculum	Computer Science Curriculum
4.2. competencies	Theoretical and experimental knowledge in the master specialization Knowledge of modelling of relevant domain applications Advanced software development knowledge and skills

5. Conditions (if necessary)

5.1. for the course	
5.2. for the seminar /lab activities	The hosting institutions should provide at least the following resources: • Scientific references for the scientific problem to be investigated • Relevant data to help in the validation of any software implementation • Fully licensed computer space • Fully licensed software development tools

6.1. Specific competencies acquired [1]

Professional/essential competencies	Identification of appropriate methodologies from the domains of high performance computing and big data analytics. Use of methodologies, specification mechanism and development frameworks for developing high performance software applications Development of dedicated software projects.	•
Transversal competencies	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. Efficient progress of group activities and development of communications skills and collaboration. 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.	•

6.2. Learning outcomes

Knowledge	- The graduate has the necessary knowledge to devise, model and design of complex software application in the field of high performance computind and/or big data analytics. - The graduate knows the software processes and can integrate them in the organisational culture of a software company.
Skills	- The graduate can use specific language and terminology for the field of high performance computind and/or big data analytics being able to communicate and interact with members of a team. - The graduate proves the capacity to reflect over own learning resources.
Responsibility and autonomy:	- The graduate uses efficient strategies, methods and techniques for lifelong education, in order to self-educate and self-develop his/her personal and professional skills. - The graduate has the ability to combine information in different ways in order to form a positive attitude towards his/her own development. - The graduate proves advance programming skills which will allow to learn and comprehend modern technologies.

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

7.1 General objective of the discipline	Gaining abilities to execute a product/program in teams, writing project documentation, under the supervision of a specialized internship tutor and academic staff. This internship project is associated to the research project: the research project is the scientific and experimental documentation, the internship activity is software development related	
7.2 Specific objective of the discipline	Execute a proejct in teamwork Write necessary documentations for a scientific project Public project presentation	

8. Content

8.1 Course	Teaching methods	Remarks
8.2 Seminar / laboratory	Teaching methods	Remarks
Phase 1. Establish the problem statement to be solved. Study the theoretical implications.	Exposure, description, explanation,	

[1] One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

Phase 2. Establish the scientific methods and models to pursue Scientific investigation on the methods and models and their suitability for the task	Dialog lecture, discussions, team debate	
Phase 3. Develop detailed specifications of the project Project analysis: entities and relations identification, use scenarios, data flow diagrams	Dialog lecture, discussions, team debate	
Phase 4. Design : conceptual data model, logical data model, computation design, physical data model, user interface, application architecture Implementation and testing.	Questioning, discovery	
Phase 5. Integration Testing Experiments, data collection, results evaluation	Case study, cooperation, questioning	
Phase 6. Project presentation and defense	Evaluation	

Bibliography

1. M. Frențiu, I. Lazăr, Bazele Programării: Proiectarea Algoritmilor, Ed. Univ. Petru Maior, Tg.Mureş, 2000.
2. M. Frențiu, I. Lazăr, S. Motogna, V. Prejmerean, Elaborarea algoritmilor, Ed. Presa Universitara, Clujeana, Cluj-Napoca, 1998.
3. M. Frențiu, I.A. Rus, Metodologia cercetării științifice de informatică, Presa universitară clujeană, 2014.
4. B. Pârv, Analiza si proiectarea sistemelor,Universitatea Babes-Bolyai, Centrul de Formare Continua si Învatamânt la Distanta, Facultatea de Matematica si Informatica, Cluj-Napoca, ed. a III-a, 2003.
5. L. Țâmbulea, Baze de date, Litografia UBB Cluj-Napoca 2001.

Electronic resources for the specific investigated research subject

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 respects the IEEE and ACM Curricula Recommendations for Computer Science studies.
- Offers an overall perspective of Computer Science domain, and an general expertise for the student.
- Offers basic knowledge about teamwork and integration in an academic institution or software company.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course			
10.5 Seminar/laboratory	Project evaluation	The institution tutor assesses the performance of the interns.	80%
		The faculty mentor assesses the activities (based on Activity Report)	20%
10.6 Minimum standard of performance			
At least grade 5 (from a scale of 1 to 10)			

11. Labels ODD (Sustainable Development Goals)[2]

Not applicable.

Date: ...	Signature of course coordinator	Signature of seminar coordinator Assoc. Prof. Dr. Virginia Niculescu
Date of approval: ...		Signature of the head of department Assoc.prof.phd. Adrian STERCA

[2] Keep only the labels that, according to the *Procedure for applying ODD labels in the academic process*, suit the discipline and delete the others, including the general one for *Sustainable Development* – if not applicable. If no label describes the discipline, delete them all and write „*Not applicable.*".