COURSE DESCRIPTION

Quantitative and Qualitative Evaluation of Software Quality

Academic year 2026-2027

1. Programme-related data

1.1. Higher Education Institution	**Babeş-Bolyai University of Cluj-Napoca**
1.2. Faculty	**Faculty of Mathematics and Computer Science**
1.3. Doctoral Shool	**Doctoral School in Mathematics and Computer Science**
1.4. Field of study	**Computer Science**
1.5. Level of study	**Doctoral studies**

2. Course-related data

2.1. Course title	**Quantitative and Qualitative Evaluation of Software Quality**			Course code	**MDE8175**
2.2. Course coordinator	**Prof.dr. Simona Motogna**				
2.3. Seminar coordinator	**Prof.dr. Simona Motogna**				
2.4. Year of study	1	2.5. Semester	1	2.6. Type of assessment	Exam
2.7. Course status	Optional			2.8. Course type	Specialisation subject

3. Total estimated time (hours per semester of teaching activities)

3.1. Number of hours per week	**3**	of which: 3.2. course	**2**	3.3. seminar/ laboratory/ project	**1**
3.4. Total of hours in the curriculum	36	of which: 3.5. course	24	3.6. seminar/ laboratory	**12**
Time allocation for individual study (IS) and self-taught activities (ST)					**hours**
Learning from textbooks, course materials, bibliography, and notes (IS)					70
Additional research in the library, on subject-specific electronic platforms, and on-site					70
Preparing seminars/ laboratories/ projects, assignments, reports, portfolios, and essays					50
Tutoring (professional guidance)					10
Examinations					10
Other activities: communication with course coordinator					4
3.7. Total hours of individual study (IS) and self-taught activities (ST)				**214**	
3.8. Total hours per semester				**250**	
3.9. Number of credits				**10**	

4. Prerequisites (where applicable)

4.1. curriculum-related	
4.2 skills-related	Basic software development skills

5. Specific conditions (where applicable)

5.1. course-related	
5.2. seminar/laboratory-related	

6. Subject-specific learning outcomes

Knowledge
1. The graduate can apply advanced software engineering knowledge starting from a high level of abstraction and being able to offer implementation solutions for complex software systems
2. The graduate has knowledge regarding essential software quality factors
3. The graduate possess fundamental knowledge to assess the quality of a software system in general and of particular quality factors in detail
Skills
1. The graduate has the skills to perform research in software engineering especially for software quality
2. The graduate possesses the fundamental skills for software quality, being able to analyse real life software systems
3. The graduate has skills to perform quality audit of software systems
Responsibility and autonomy
1. The graduate can carry out on his/her own quality assessment of software systems
2. The graduate has the autonomy to improve the quality of software systems
3. The graduate can perform on their own research investigation in software quality topic

7. Contents

7.1. Course	**Teaching and learning methods**	**Remarks[1]**
Introduction; characteristics, facts and statistics	Exposure,description, explanation, debate and dialogue, discussion of case studies	
Software quality assurance and SQ Models	Exposure,description, explanation	
SQ factors – reliability	Exposure,description, explanation	
SQ factors – integrity, security, safety	Exposure,description, explanation	
SQ factors – efficiency, maintainability, flexibility	Exposure,description, explanation	
SQ metrics and tools	Exposure,description, explanation	
Quantitative methods for quality evaluation	Exposure,description, explanation	
Qualitative methods for quality evaluation	Exposure,description, explanation	

Bibliography:

1. D. Galin – Software quality assurance – From theory to implementation, Addison Wesley, 2003
2. S.H. Kan –Metrics and models in Software Quality Engineering. Addison Wesley, 2nd ed., 2003
3. R.A. Khan, K. Mustafe, S.I. Ahson – Software Quality: Concepts and Practice, Alpha Science, 2006
4. G. Schulmeyer - Handbook of Software Quality Assurance , Artech House, 2007
5. D. Spinellis. *Code Quality: The Open Source Perspective*. Addison Wesley, 2006

S. McConnell – Code Complete, 2nd Edition, Microsoft Press, 2004

[1] For example, organisational aspects, recommendations for students, specific aspects relating to the course/seminar, such as inviting experts in the field, etc.

7.2. Seminar/ laboratory	Teaching and learning methods	Remarks
Apply and evaluate a Code review tool	Conversation, debate, case studies	
Apply and evaluate a Metrics tool	Conversation, debate, case studies	
Project: quatitative and qualitative methods for software quality	Conversation, debate, case studies	
Project presentation	Evaluation	
Bibliography: same as course		

8. Evaluation

Type of activity	8.1 Evaluation criteria[2]	8.2 Evaluation methods[3]	8.3 Percentage in the final grade
8.4. Course	Report on scientific literature	Written report	30%
8.5. Seminar/ laboratory	Report on evaluation of quality factors	Written report	70%
8.6 Minimum standard for passing			
➢ Both reports are mandatory ➢ Understand and apply software quality attributes in software development Evaluate software quality of applications			

9. SDG labels (Sustainable Development Goals)[4]

	○	Sustainable Development Generic Label

								
○	○	○	○	○	○	○	○	○
								No label applies

[2] The evaluation criteria must directly reflect the learning outcomes targeted at the level of the degree programme respectively at the level of the subject. More specifically, the learning outcomes set out in the expected learning outcomes are assessed.

[3] Both final evaluation methods and ongoing evaluation strategies should be established.

[4] Select a single label which, according to the *Implementation of SDG labels in the academic process*, best matches the subject. If the subject addresses sustainable development in a generic manner (i.e. by presenting/introducing the general framework of sustainable development, etc.), then the Sustainable Development generic label may be applied. If none of the labels describe the subject, select the last option: *"No label applies."*

			YES					

Date of entry:
16.02.2026

Signature of course coordinator

Signature of seminar coordinator

Date of approval in the department:
...

Signature of the head of department

.....