COURSE SYLLABUS

Academic year 2024-2025

1. Programme Information

1.1. Higher education institution	**Lucian Blaga University of Sibiu**
1.2. Faculty	Faculty of Engineering
1.3. Department	Department of Computer Science and Electrical and Electronics Engineering
1.4. Field of study	Computer Science and Information Technology
1.5. Level of study[1]	Master
1.6. Programme of study/qualification	EMBEDDED SYSTEMS

2. Course Information

2.1. Name of course	Software Engineering			Code	ES.102.RO
2.2. Course coordinator	Assoc. Prof. Nicolae Dorin SIMA, PhD				
2.3. Seminar/laboratory coordinator	conf. dr. ing. Nicolae Dorin SIMA				
2.4. Year of study[2]	1	2.5. Semester[3]	1	2.6. Evaluation form[4]	E
2.7. Course type[5]	O	2.8. The formative category of the course[6]			R

3. Estimated Total Time

3.1. Course Extension within the Curriculum – Number of Hours per Week					
3.1.a. Lecture	3.1.b. Seminar	3.1.c. Laboratory	3.1.d. Project	3.1.e. Other	Total
2		2	1		**5**
3.2. Course Extension within the Curriculum – Total Number of Hours within the Curriculum					
3.2.a. Lecture	3.2.b. Seminar	3.2.c. Laboratory	3.2.d. Project	3.2.e. Other	Total[7]
28		28	14		**70**

Time Distribution for Individual Study[8]	**Hours**
Learning by using course materials, references and personal notes	10
Additional learning by using library facilities, electronic databases and on-site information	10
Preparing seminars / laboratories, homework, portfolios and essays	70
Tutorial activities[9]	10
Exams[10]	5
3.3. Total Individual Study Hours[11] ($NOSI_{sem}$)	**105**
3.4. Total Hours in the Curriculum ($NOAD_{sem}$)	**70**
3.5. Total Hours per Semester[12] ($NOAD_{sem} + NOSI_{sem}$)	**175**
3.6. No. of Hours / ECTS	**25**
3.7. Number of credits[13]	**7**

4. **Prerequisites (if needed)**

5. **Conditions** (where applicable)

6. **Specific competencies acquired**[14]

Number of credits assigned to the discipline		7	Credits distribution by competencies
6.1. Professional competencies	PC1	approve engineering design	1
	PC2	perform project management	
	PC3	operate open source software	
	PC4	disseminate results to the scientific community	2
	PC5	perform scientific research	
	PC6	evaluate research activities	
6.2. Transversal competencies	TC1	apply knowledge of science, technology and engineering	3
	TC2	show initiative	1
	TC3	assume responsibility	

7. **Course objectives** (resulted from developed competencies)

7.1. Main course objective	Object-Oriented Software Construction
7.2. Specific course objectives	Understanding what is a complex system, and complexity management Working with Object Oriented Design Patterns Learning to Think in the Abstract

8. **Content**

8.1 Lectures[15]		**Teaching methods**[16]	**Hours**
Lecture 1	Project Organization and Management	video projector	2
Lecture 2	Software Lifecycle Models. Scrum	video projector	2
Lecture 3	Prototyping. UML Activity Diagram	video projector	2
Lecture 4	Software Configuration Management	video projector	2
Lecture 5	Version Control System, Distributed Version Control	video projector	2
Lecture 6	Object Oriented Programming	video projector	2
Lecture 7	User Interface Design	video projector	2
Lecture 8	Requirements Analysis, Requirements Elicitation	video projector	2
Lecture 9	UML Use Case Diagram, Analysis Object Model, Incomplete	video projector	2
Lecture 10	System Design	video projector	2
Lecture 11	Design Patterns, Incomplete	video projector	2
Lecture 12	Testing, Exception Handling, Unit Testing	video	2

		projector	
Lecture 13	Mock Object Pattern, Dependency Injection	video projector	2
Lecture 14	Build and Release Management	video projector	2
		Total lecture hours:	**28**

8.2 Practical activities

8.2.b. Laboratory		**Teaching methods**[17]	**Hours**
Laboratory 1	Requirements. UML: UseCase, UC Diagrams	Practical	2
Laboratory 2	Building the Software Requirement Specifications	Practical	2
Laboratory 3	CRC- based Design 1	Practical	2
Laboratory 4	CRC- based Design 2	Practical	2
Laboratory 5	Detailed Design. 1	Practical	2
Laboratory 6	Detailed Design. 2	Practical	2
Laboratory 7	Development Tools 1	Practical	2
Laboratory 8	Development Tools 2	Practical	2
Laboratory 9	System Architecture 1	Practical	2
Laboratory 10	System Architecture 2	Practical	2
Laboratory 11	Automated Testing. 1	Practical	2
Laboratory 12	Automated Testing. 2	Practical	2
Laboratory 13	Marks 1	Practical	2
Laboratory 14	Marks 2	Practical	2
		Total laboratory hours:	28

8.2.c. Project		**Teaching methods**[18]	**Hours**
Project 1	Requirements Elicitation	discussions with students	2
Project 2	Analysis Object Model	discussions with students	2
Project 3	CRC- based Design	discussions with students	2
Project 4	Detailed Design	discussions with students	2
Project 5	System Architecture	discussions with students	2
Project 6	Testing	discussions with students	2
Project 7	Evaluation	discussions with students	2
		Total project hours:	14

9. Bibliography

9.1. Recommended Bibliography	Sommerville, Ian; Software Engineering, Boston; Columbus; New York: Pearson, 2011
	Larman C.: Applying UML and Patterns, Prentice Hall, 2002 (pdf).
	Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides - Design Patterns, Elements of Reusable Object-Oriented Software, Addison-Wesley, 1995
	Martin Fowler, Kendall Scott - UML Distilled, second edition Addison-Wesley, 2000

9.2. Additional Bibliography	

10. Conjunction of the discipline's content with the expectations of the epistemic community, professional associations and significant employers of the specific study program[19]

Curricula are continuously updated based on the most prestigious international text-books and also based on the most relevant progresses in this field (as these developments are presented in top-level scientific reviews, research projects and international conferences).

11. Evaluation

Activity Type	11.1 Evaluation Criteria	11.2 Evaluation Methods		11.3 Percentage in the Final Grade	Obs.[20]
11.4a Exam / Colloquy	• Theoretical and practical knowledge acquired (quantity, correctness, accuracy)	Tests during the semester[21]:	40%	40%	
		Homework:	20%		
		Other activities[22]:	20%		
		Final evaluation:	20% (min. 5)		
11.4b Seminar	• Frequency/relevance of participation or responses	Evidence of participation, portfolio of papers (reports, scientific summaries)		40%	
11.4c Laboratory	• Knowledge of the equipment, how to use specific tools; evaluation of tools, processing and interpretation of results	• Written questionnaire • Oral response • Laboratory notebook, experimental works, reports, etc. • Practical demonstration		10%	
11.4d Project	• The quality of the project, the correctness of the project documentation, the appropriate justification of the chosen solutions	• Self-evaluation, project presentation • Critical evaluation of a project		10%	
11.5 Minimum performance standard[23] 50% after suming column 4 values					

The Course Syllabus will encompass components adapted to persons with special educational needs (SEN – people with disabilities and people with high potential), depending on their type and degree, at the level of all curricular elements (skills, objectives, contents, teaching methods, alternative assessment), in order to ensure fair opportunities in the academic training of all students, paying close attention to individual learning needs.

Filling Date: 13.09.2024

Department Acceptance Date: 16.09.2024

	Academic Rank, Title, First Name, Last Name	**Signature**

Course Teacher	Assoc. Prof. Nicolae Dorin SIMA, PhD	
Study Program Coordinator	Prof. Arpad GELLERT, PhD	
Head of Department	Assoc. Prof. Radu George CREȚULESCU, PhD	
Dean	Prof. Maria VINȚAN, PhD	

[1] *Bachelor / Master*
[2] *1-4 for bachelor, 1-2 for master*
[3] *1-8 for bachelor, 1-3 for master*
[4] *Exam, colloquium or VP A/R - from the curriculum*
[5] *Course type: R = Compulsory course; E = Elective course; O = Optional course*
[6] *Formative category: S = Specialty; F = Fundamental; C = Complementary; I = Fully assisted; P = Partially assisted; N = Unassisted*
[7] *Equal to 14 weeks x number of hours from point 3.1 (similar to 3.2.a.b.c.)*
[8] *The following lines refer to individual study; the total is completed at point 3.37.*
[9] *Between 7 and 14 hours*
[10] *Between 2 and 6 hours*
[11] *The sum of the values from the previous lines, which refer to individual study.*
[12] *The sum (3.5.) between the number of hours of direct teaching activity (NOAD) and the number of hours of individual study (NOSI) must be equal to the number of credits assigned to the discipline (point 3.7) x no. hours per credit (3.6.)*
[13] *The credit number is computed according to the following formula, being rounded to whole neighbouring values (either by subtraction or addition*

$$No.credits = \frac{NOCpSpD \times C_C + NOApSpD \times C_A}{TOCpSdP \times C_C + TOApSdP \times C_A} \times 30credits$$

Where:

- NOCpSpD = Number of lecture hours / week / discipline for which the credits are calculated
- NOApSpD = Number of application hours (sem./lab./pro.) / week / discipline for which the credits are calculated
- TOCpSdP = Total number of course hours / week in the Curriculum
- TOApSdP = Total number of application hours (sem./lab./pro.) / week in the Curriculum
- C_C/C_A = Course coefficients / applications calculated according to the table

Coefficients	**Course**	**Applications (S/L/P)**
Bachelor	2	1
Master	2,5	1,5
Bachelor - foreign language	2,5	1,25

[14] *Competences from the Grids related to the description of the study program, adapted to the specifics of the discipline*
[15] *Chapter and paragraph titles*
[16] *Exposition, lecture, board presentation of the studied topic, use of video projector, discussions with students (for each chapter, if applicable)*
[17] *Practical demonstration, exercise, experiment*
[18] *Case study, demonstration, exercise, error analysis, etc.*
[19] *The relationship with other disciplines, the usefulness of the discipline on the labour market*
[20] *CPE – Conditions Exam Participation; nCPE – Does Not Condition Exam Participation; CEF - Conditions Final Evaluation; N/A – not applicable*
[21] *The number of tests and the weeks in which they will be taken will be specified*
[22] *Scientific circles, professional competitions, etc.*
[23] *The minimum performance standard in the competence grid of the study program is customized to the specifics of the discipline, if applicable*