

**SYLLABUS**  
for the discipline:

**“SOFTWARE ENGINEERING”**

**FACULTY OF AUTOMATION AND COMPUTERS**

**DOMAIN/SPECIALIZATION: MASTER AUTOMOTIVE EMBEDDED SOFTWARE**

**Year of studies: I**

**Semester: 1**

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| <b>Course instructor:</b> prof. dr. eng. Vasile Stoicu-Tivadar<br><b>Applications instructor:</b> prof. dr. eng. Vasile Stoicu-Tivadar |
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| <b>Number of hours/week/Evaluation/Credits</b> |                |                   |                |                   |                |
|--|----------------|-------------------|----------------|-------------------|----------------|
| <b>Course</b>                                  | <b>Seminar</b> | <b>Laboratory</b> | <b>Project</b> | <b>Evaluation</b> | <b>Credits</b> |
| <b>3</b>                                       | <b>0</b>       | <b>1</b>          | <b>0</b>       | <b>E</b>          | <b>8</b>       |

**A. COURSE OBJECTIVES**

Tuition of the main concepts in software design and team work: knowledge and practical skills about software development life cycle, objectives, principles and techniques, with emphasis on real-time systems, embedded systems and object-oriented technologies.

Acquiring of knowledge and skills for the successfully approach of medium sized software projects.

The course contributes to the skills 1 (40 %), 2(10 %), 3(20%), and 4 (30%) from the skills table.

**B. COURSE SUBJECTS**

Why software engineering? (software engineering definition, system approach, engineering approach, examples) (3h)

Objectives and principles of software engineering (3h)

The software lyfe cycle (phases: planning, requirements and specifications, design, implementation, integration and test, maintenance, paradigms: Waterfall life-cycle, V-cyle, the spiral model, Rapid Prototyping, standards) (6h)

Software development (requirements, design, writing the program, testing the program, testing the system, delivering, maintenance, evaluating the product, improving) (3h)

Configuration Management: the problem, program families, revisions, variations, derivations, workspaces, locking, applying the principles (6h)

Real-time specification and design techniques (specific approaches, performance analysis, reliability and fault tolerance, hardware/software integration, examples) (3h)

UML: static and dinamic design, object-oriented analysis and design, managing complexity (grouping, hiding, completing), abstraction, categories, paradigms, real-time UML (Requirements Analysis of Real-Time Systems, Defining the Object Structure, Defining Object Behavior, Architectural Design, Mechanistic Design, Detailed Design) (12h)

Testing: reviews and review methods, test strategy, test planning, tracking and measuring tests, testing based on behavior specification (look-and-see, blueprint-based, state-transition-based, combining). (6h)

**C. APPLICATIONS SUBJECTS (laboratory, seminar, project)**

Configuration management. Using WinCVS (4h)

Using Rational ROSE (case study) (3h)

Modelling with Rational ROSE. Use Cases, Actors, Association, Aggregation, Dependencies. (4h)

Modelling with Rational ROSE. Class Diagrams, State Models. (3h)

#### **D. REFERENCES**

1. Huphery, W., "Introduction to the team Software Process", Addison-Wesley, 2000
2. Pfleeger, S.L., "Software Engineering. Theory and Practice", Prentice Hall, 1998
3. Laplante, P.A., "Real-time systems. Design and analysis", IEEE Press, 1997

#### **E. EVALUATION PROCEDURE**

Written exam: test, 50 questions with unique response, allocated time: 45 minutes.

The final mark is  $\text{Int}(0,66 * \text{test} + 0,34 * \text{mark on applications} + 0,5)$

#### **F. INTERNATIONAL COMPATIBILITY**

Carnegie-Mellon University, USA, (<http://www.cmu.edu>)

University of Kaiserslautern, Germany (<http://www.uni-kl.de>)

Lancaster University, UK, (<http://www.lancs.ac.uk>)

Date: jan., 30, 2009

**HEAD OF DEPARTMENT**

**Prof. dr. eng. Ioan Silea**

**COURSE INSTRUCTOR,**

**prof. dr. eng. Vasile Stoicu-Tivadar**