



Design of Safe and Reliable Systems (3 ECTS)

Syllabus for professional engineering studies on higher education institutes

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LEARNING OUTCOMES

After completion of this course the student will be able to perform an application specific risk analysis, has knowledge of the fundamental defect mechanisms and load-bearing limits of hardware components, the typical error mechanisms in software components and can design a fail-safe technical system for a given purpose, which ensures the required minimum amount of functionality for a safe operation in case of a defect by suitable measures. Methodological competencies: Interdisciplinary thinking, acting and communication.

RECOMMENDED PRELIMINARY STUDIES

1. C-Programming fundamentals
2. (Digital) electronic circuits
3. Mechatronic basics

COURSE CONTENTS

1. Introduction
2. Learning from accidents
3. Risk analysis and risk reduction methods
4. Robust design of hardware and software
5. Methods for failure tolerance
6. Safety architectures
7. Robot competition

REQUIRED LABORATORY ENVIRONMENT

1. Computer (e.g. Windows OS).
2. Lego-Mindstorm sets
3. Test environment for robots

RECOMMENDED STUDYING MATERIAL

- Electronic Safety Systems, Josef Börcsök
- IEC EN 61508 (Functional Safety, Safety Related Systems)

ASSESSMENT CRITERIA

The course assessment is based on

- active attendance
- continuous assessment of lab exercises
- individual contribution to project



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It is highly recommended that on-site students attend all sessions. Timing of the exercises and project deadlines are scheduled such that the course can be completed on extended time period on one study semester, if agreed with the home institute degree programme.

STUDENT WORK LOAD

Lectures 5x4h

Home exercises 10h

Project 30h

Self study 20h

Total 80h = 3ECTS

EXAM

Active participation in a robot design are compulsory. Each late day after the deadline reduces the total amount of points. Exam on the last day of the intensive week.