TECHNISCHE UNIVERSITÄT
CHEMNITZ

Fakultät für Informatik
Professur Technische Informatik

Automotive Software Engineering

Lecture 1 - Introduction

Prof. Dr. Wolfram Hardt
Dipl. –Inf. Englisch Norbert
M. Sc. Khan Owes

16th October 2017

ASE Practical overview

- 4 Tracks:
  - Tuesday from 11:30AM to 15:15PM
    Group 1: each alternate week, starting at **17th October 2017**
    Group 3: each alternate week, starting at **24th October 2017**
  - Friday from 13:45PM to 17:00PM
    Group 2: each 2nd week, starting at **20th October 2017**
    Group 4: each 2nd week, starting at **27th October 2017**
    →Be punctual!
    →Prepare units at home
    →Explain your solution
  - **Check the concrete timings of each group on slide 4! Because of vacation are not in the regular 14day pattern .**

- **Register in OPAL → link on website of professorship (16th October 2017)**

  http://www.tu-chemnitz.de/informatik/ce/lectures/lectures.php

Lecture ASE

- The lecture prepares you for the units, it gives you the most important facts about the next practical unit

- Each second week, starting at 16th October 2017,
  Room: 1/219
  Time: 17:15 AM – 18:45 PM

- Topics of Lecture:
  Communication, Bus Systems, AUTOSAR, Test of ECUs

- **Join the lecture** – it is very important for passing the units and passing the exam!

ASE Practical overview

	Group 1	Group 2	Group 3	Group 4
Unit 1	17.10.2017	20.10.2017	24.10.2017	27.10.2017
Unit 2	14.11.2017	17.11.2017	07.11.2017	10.11.2017
Unit 3	28.11.2017	01.12.2017	21.11.2017	24.11.2017
Unit 4	12.12.2017	15.12.2017	05.12.2017	08.12.2017
Unit 5	09.01.2018	12.01.2018	16.01.2018	13.01.2018
Repeating Unit	23.01.2018 (for Group 1 & Group 3) 26.01.2018 (for Group 2 & Group 4)			

Register for one group!
Switching between the groups is not allowed!

ASE Practical – overview of units

- Each unit starts with a short written test

  Be punctual! The test is written at the beginning of each unit – if you are not present, you will fail.

- 5 (+1) Units – each Unit 5 Points = Overall 25 Points

Short Test	2 or 3 Points
Practical	3 or 2 Points

  →>0 points in Test **AND** in Practical are needed to pass a Unit

- You can repeat **exactly** one unit one time (if a Unit is not passed)

- Repeating unit is at the end of the semester (shortly before exams)

ASE Practical – schedule of each unit

TEST	PRACTICAL	PRESENTATION	RESULT
Written Test of each student	Practical itself, executing code prepared at home, little help by supervisors possible	Presentation of ALL Tasks to supervisor	Result of written test AND practical
5 to 15 minutes	round about 160 minutes, depending on other slots	5 minutes **!!!**	2 minutes

- Prepare Units at home (algorithms, code) → compile and debug in practical
- Show and explain your results – Explain the important facts/features
- If you did not present your tasks until the end of the unit, your practical unit is defined as failed (0 points)
- Consider lunch break for Friday groups

ASE Practical – exam

- „Studienordnung 2010“:
  - Do all 5 units → you will get 2 credits
  - No exam

- „Studienordnung 2016“ and „Studienordnung 2013“:
  - Do all 5 units → if you pass them, you can register for the exam
  - Practical units + exam → you will get 5 credits
  - Exam handles topics of the units – 90 minutes written exam

ASE Practical – topics of units

1 Unit (Introduction): *(3+2 Points)*
To get to know the Board

2. Unit (CAN1): *(2+3 Points)*
Easy CAN, Connection ECU/PC, R/W CAN

3. Unit (CAN2): *(2+3 Points)*
Teamwork, Bus-System CAN

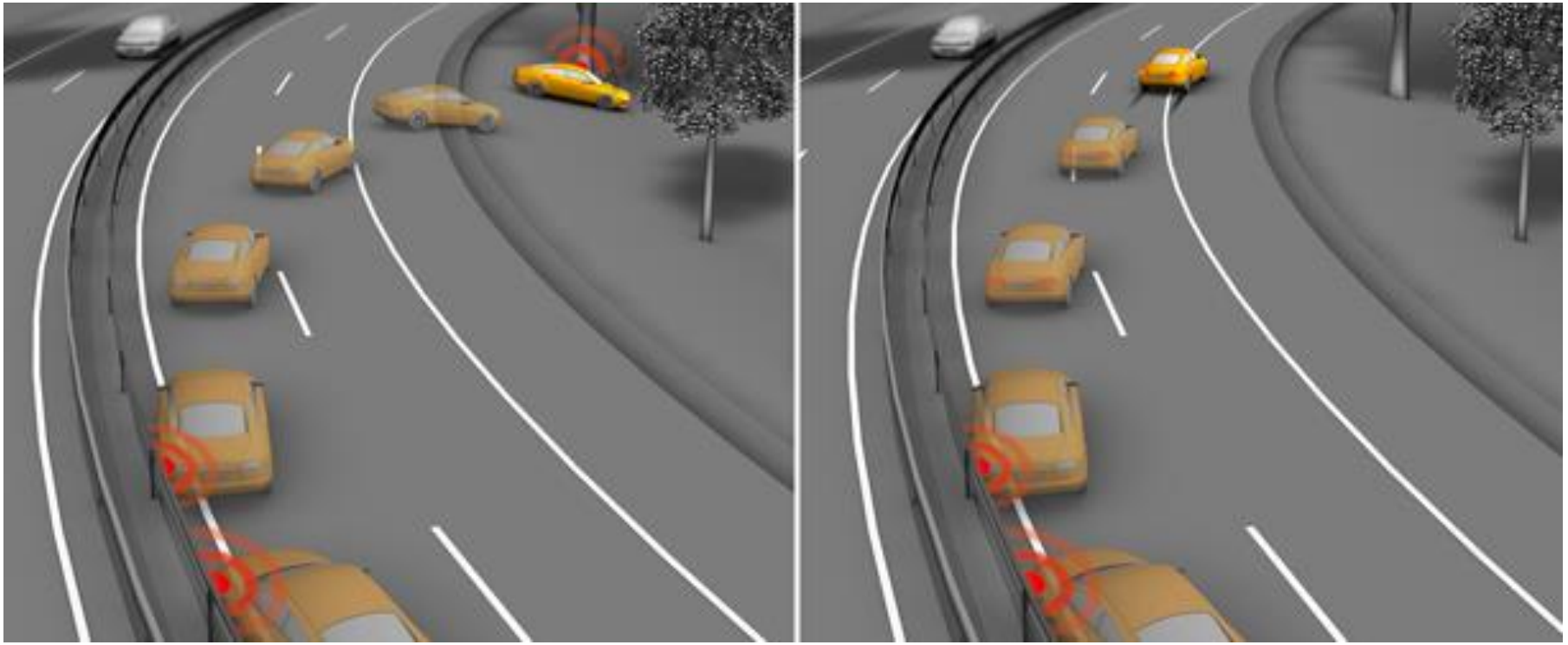
4. Unit(AUTOSAR): *(2+3 Points)*
AUTOSAR Application

5. Unit (Test): *(2+3 Points)*
Black Box Test ECU, manual an automatic

Example ASE: Pre-Crash-System

Source: http://www.auto-motor-und-sport.de/bilder/pre-safe-und-pre-cash-system-schutz-bereits-vor-dem-crash-1205775.html

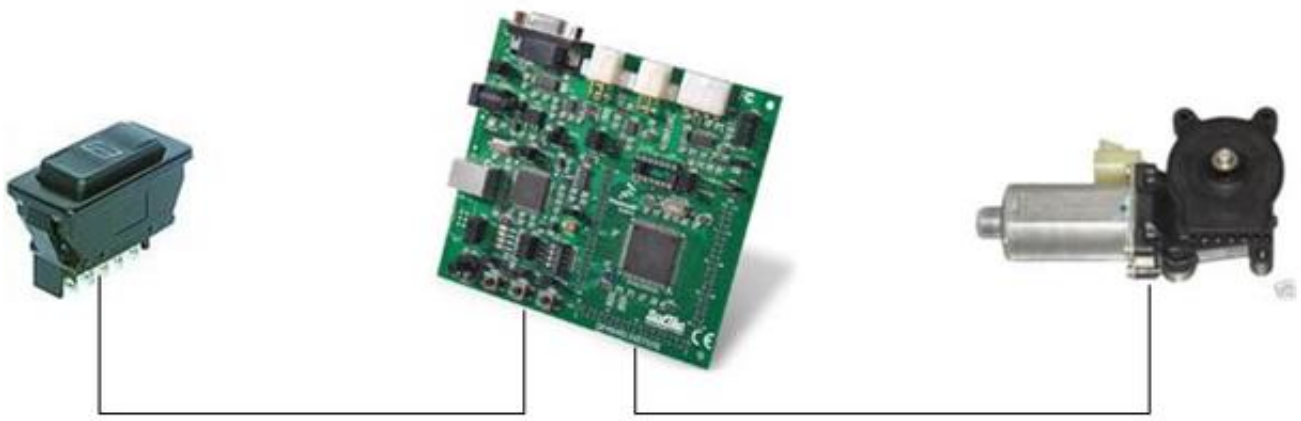
Example ASE: Post-Crash-System



Source: http://www.atzonline.de/Aktuell/Nachrichten/1/16280/Neues-Post-Crash-Bremssystem-von-Continental-verhindert-Folgeunfaelle.html

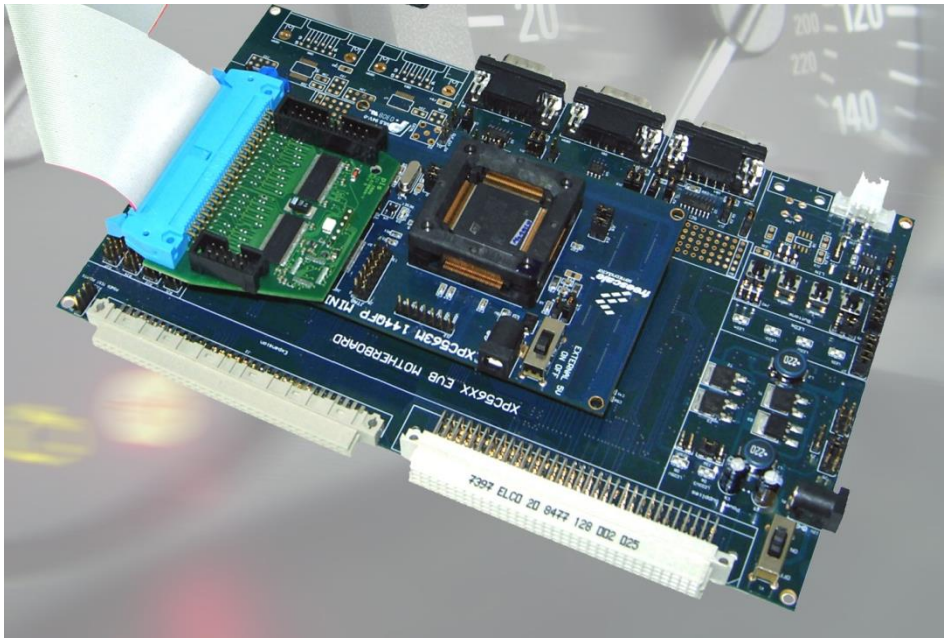
ECU overview

- ECU = Electronic Control Unit
- ECU integrates functionalities for calculation, analysis of sensor data and controlling actuators
- A premium car has up to 80 ECUs – connected to different bus systems (like CAN Bus)

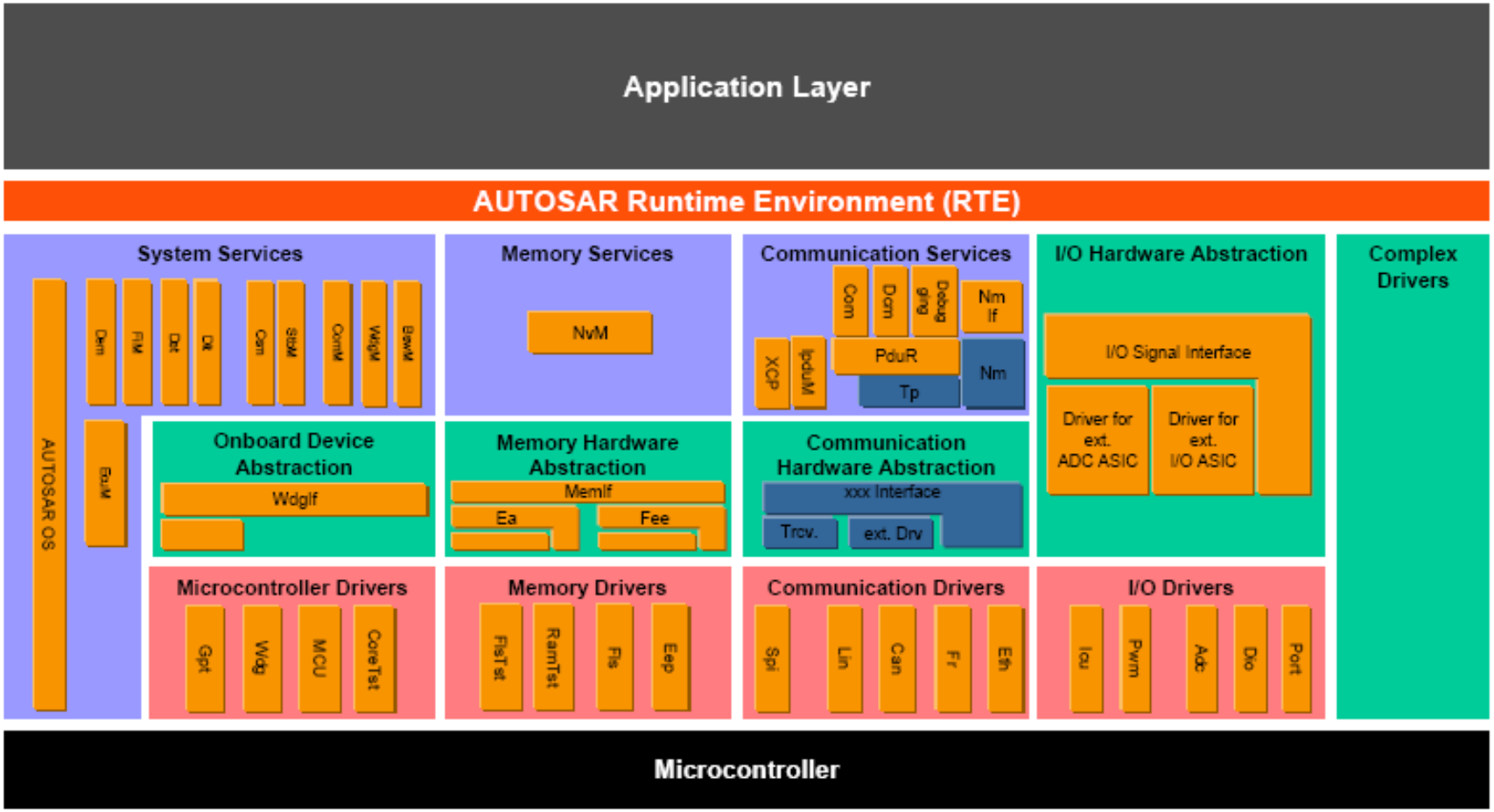


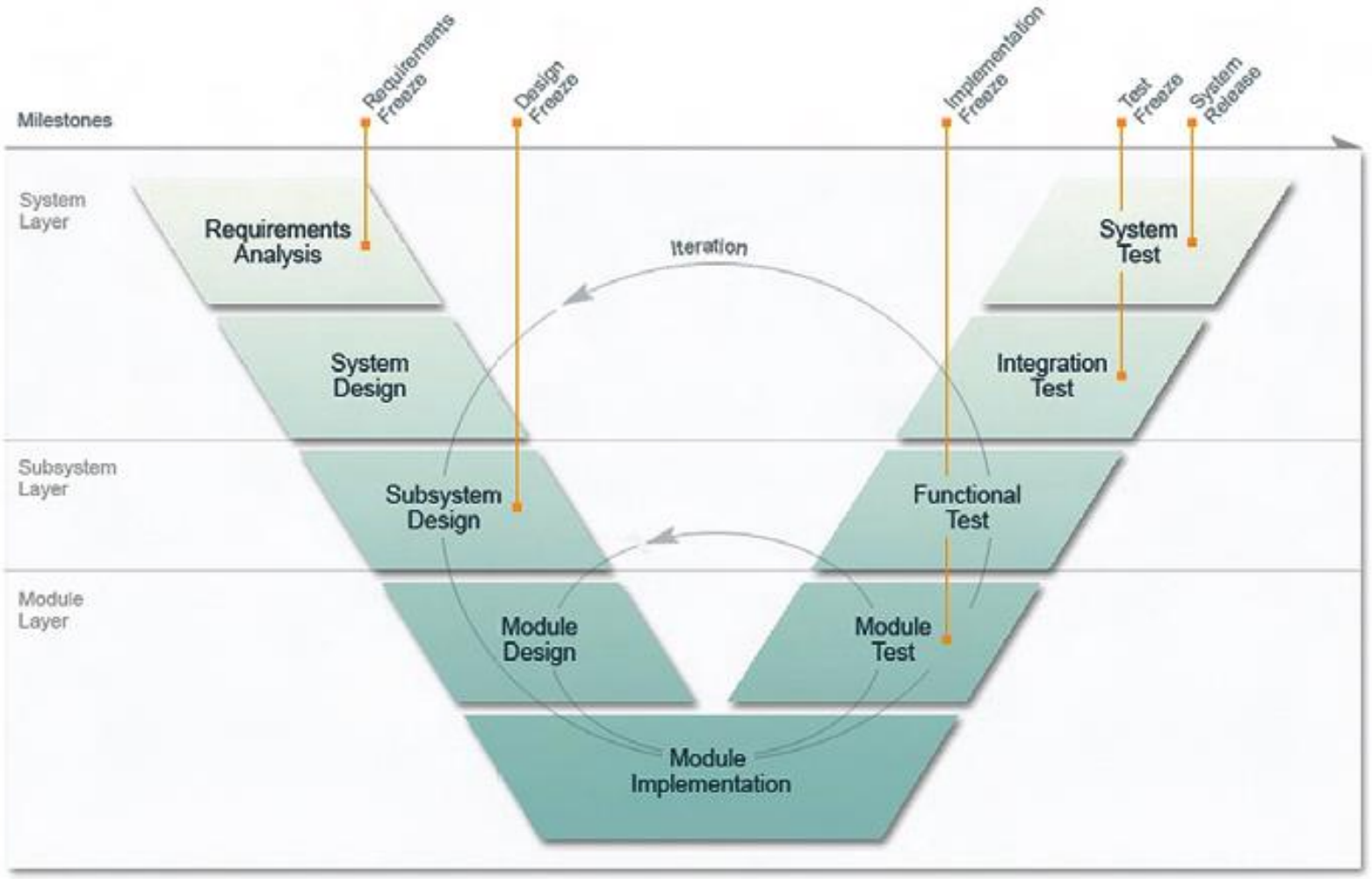
ECU used in practical

STM SPC560 (AUTOSAR 3.1) → used in Yellow Car demonstrator



AUTOSAR Overview




Milestones
Requirements Freeze
Design Freeze
Implementation Freeze
Test Freeze
System Release
System Layer
Requirements Analysis
System Design
Iteration
System Test
Integration Test
Subsystem Layer
Subsystem Design
Functional Test
Module Layer
Module Design
Module Test
Module Implementation

Thanks for your attention!

Good luck with your Master Course!