Name of module:	**Electric and Electronics Architecture**
Keywords:	CAN, LIN, MOST, FlexRay, LED, K-Matrix
Modulenumber:	**ASM 233**
Target group(s):	2nd semester ASM
ECTS-Credits:	9
Language of instruction:	english
Module owner:	Prof. Jürgen Minuth

Extent of work (hours)

Workload	Contact hours	Self study	Exam preparation
270	135	65	70

Prerequisites: advanced theoretical and practical knowledge in electronics (analogue and digital) and software technologies (language C) as well as serial communication

Total target: The job description of an automotive electrical engineer is based on the understanding how to deal with networked electronic control units often.

Module content:
communication basics (e.g. coding and bus-access)
requirements to automotive communication (latency, protocols, communication matrix etc.)
protocols (e.g. CAN, LIN, FlexRay, MOST)
hardware architecture of permanently powered electronic control units (e.g. placement and layout)
design and test of automotive electronics modules (e.g. reverse connection protection, analogue and digital signal acquisition, switching regulators) basics to ensure EMC automotive requirements to ECUs (e.g. temperature, vibrations, power supply (e.g. jump-start, load dump))
radiation and irradiation
simulation of dedicated automotive circuits photometry und ray optics, lighting and cameras
implementation, test and start-up of typical automotive applications

Reference material:
- handouts

Offered: Summer term only

Submodules and assessment

Title of submodule **Electronics and Communication 1**

Type of instruction / form of learning: Lecture
ECTS-Credits: 2
Hours per week: 2
Aims, learning outcomes: coding and bus access, communication protocols
Type of assessment: Final written examination part I: 60 min (together with prototyping and simulation)

Title of submodule **Prototyping and Simulation**

Type of instruction / form of learning: Lecture
ECTS-Credits: 2
Hours per week: 2
Aims, learning outcomes: HW-architecture and design of ECUs, automotive boundary conditions
Type of assessment: Final written examination part II: 60 min (together with electronics and communication 1)

Title of submodule	**optical systems**
Type of instruction / form of learning:	Lecture,
ECTS-Credits:	4
Hours per week:	4
Aims, learning outcomes:	basics photometry basics ray optic lighting (application, interfaces, LEDs) cameras (night vision, optical driver assistance)
Type of assessment:	Final written examination: 120 min

Title of submodule	**Lab Optical Systems**
Type of instruction / form of learning:	Lab
ECTS-Credits:	1
Hours per week:	1
Aims, learning outcomes:	experimental characterizing of optical components representing examples of automotive applications
Type of assessment:	Lab report