UNIVERSITÄT DUISBURG-ESSEN
Lehrstuhl Steuerung, Regelung
und Systemdynamik
Univ.-Prof. Dr.-Ing. Dirk Söffker

Wintersemester 2023/24

Course	**Functional Safety (2V, 1Ü)**
Target group	Master Program: Mechanical Engineering – some newer programs (check your Prüfungsordnung) Automation and Safety - Safe Systems Maschinen- und Anlagenbau
URL of the course	https://moodle.uni-due.de/course/view.php?id=23821
Lecturer	Univ.- Prof. Dr.-Ing. Dirk Söffker
Assistant	Olena Shyshova, M.Sc.
About course	In WiSe 23/24, the course will be realized in presence at the university. The realization is carried out via: - Lecture and exercise material (pdf) < downloadable via Moodle The basis of the course are the specified literature resources, available from the library or the WWW. The central teaching material is available as encrypted PDF documents in the Moodle course. For each lecture unit a raw manuscript is published which can be downloaded in the Moodle course **from the beginning of the course, possible week-wise**. This serves to structure/individualize the personal notes. For preparation/postprocessing of the lecture it is strongly recommended ➢ **the previous substance,** ➢ **attending the consultation hours** ➢ **as well as reading the upcoming substance in the given chapters in advance (in the specified textbook/textbook) to work out.** Due to organizational reasons the course will not take place October 31st, 2023.
Material	Moodle: Functional Safety - FS (https://moodle.uni-due.de/course/view.php?id=23821)
Registration in Moodle	The password can be requested via the e-mail address srs-pw@uni-due.de. The subject must contain only the word **FS**.

Day	Tuesday
Time	3:45 – 7:45 pm
First course	October 24th
Last course	December 12th
Room	MB 243
Consulting hours	By appointment
Literature	Norm IEC 61508 Bertsche, B. et al.: Zuverlässigkeit mechatronischer Systeme, Springer 2009 Verma, A.K. et al.: Reliability and Safety Engineering, Springer, 2009 Halang, W.A. (Hrsg): Funktionale Sicherheit, Springer, 2013 Nanda, M. et al. (Eds.): Formal Methods for Safety and Security - Case Studies for Aerospace Applications, Springer, 2018 Braband, J.: Funktionale Sicherheit. In: Fendrich, L.; Fengler, W. (Hrsg.) Handbuch Eisenbahninfrastruktur, Springer, 2019 Gilbert, G. et al. (Eds): Safety Cultures, Safety Models - Taking Stock and Moving Forward, Springer, 2019 Keller, H.B. et al. (Eds.): Technical Safety – An Attribute of Quality - An Interdisciplinary Approach and Guideline, Springer, 2018
Content	• Legal relationships and standards across different industrial sectors starting with Machinery Directive 2006/42/EG and the Product Safety Act. • Associated Terms and Methods: Terms (error, failure, malfunction), Systematic and Random Errors, Risk Assessment, Error Models, Failure Rates, Common-Mode Error, Requirements for Error Detection and Diagnostic Methods, Description of Requirements SIL, ASIL, PFD, PFH or POD, DR, FAR in the context of diagnostic methods • Methods for failure and risk minimization as well as securing functionality • Functional safety according to IEC 61508, EN 62061, and EN ISO 13849 • Development and verification methodology for the automation context according to IEC 61508
Hints	Further hints regarding lecture, exam, etc. are given in the first lecture.
Exam	Written exam, closed book, in the examination period.