Automation Engineering

Module overview
EDP designation: EITB610A
Module Responsible(s): Prof. Dr. Philipp Nenninger
Module scope (ECTS): 7 points
Classification (semester): 6th semester
Content Requirements: Knowledge of the modules control engineering, control engineering, measurement engineering
Prerequisites as per SPO: According to SPO, no formal requirements are necessary.
Competencies: Participants will be able to translate technical issues into automation solutions by

a) Apply appropriate modeling techniques and develop systems in this way b) Be able to make architectural and communication decisions to be able to design and commission systems that function in practice.
Examination Credits: The students' theoretical knowledge as well as their knowledge acquired in the laboratory will be assessed in a written exam (duration 120 min). The practical application of the skills is evaluated in the laboratory experiments through colloquia and a written report.
Usability: This module focuses on the modeling of technical processes in graphical and mathematical form as well as their program-technical realization. The mapping to concrete automation computers, on the other hand, is anchored as a focal point in the "Control Engineering" module. Although the concepts of control engineering are used for modeling, controller design, stability criteria, etc. are reserved for the "Control Engineering" module.

Course: Automation Engineering
EDP designation: NN, (EIT611A, German course)
Lecturer(s): Prof. Dr. Philipp Nenninger
Scope (SWS): 4
Cycle: Summer semester
Type, mode: lecture, compulsory subject
Teaching language: English
Contents: • Process and process types • Basics of modeling • Graphical models, mathematical models, state-oriented models (Petri nets) • Process coupling, conversion principles, coding • Scaling, standardization, monitoring of process variables • Fieldbus systems, requirements and implementation structures • Reliability, safety and availability • Process operation and monitoring • Design, organization and operation of automation systems
Recommended reading: • Polke, M.: Prozess-Leittechnik, Oldenbourg-Verlag, 1994 • Früh, K. F.: Handbuch Prozessautomatisierung, Oldenbourg, 2000 • Jakoby, W.: Automation Technology - Algorithms and Programs, Springer 1996 • Olsson; Piani: Control, Regulation, Automation, Hanser, 1993 • Bergmann, J.: Automatisierungs- und Prozeßleittechnik, Fachbuch-verlag Leipzig, 1999 • Lauber, R., Göhner, P.: Prozeßautomatisierung Band 1+2, Springer 1999 • Strohrmann, G.: Automatisierung verfahrenstech. Processes, Oldenbourg, 2002 • Lunze, J. : Automatisierungstechnik, Oldenbourg, 2003 • Schuler, H.: Litigation, Oldenbourg, 1999 • Felleisen, M.: Prozessleittechnik für die Vefahrensindustrie, Oldenbourg, 2001

- Langmann, R.: Taschenbuch der Automatisierung, Fachbuchverlag Leipzig, 2004
- Charwat, H.J.: Lexicon of Man-Machine Communication, Oldenbourg, 1994.
- Schnell, G.: Bussysteme in der Automatisierungs- und Prozesstechnik, Vieweg, 2000
- Reißenweber, B.: Fieldbus systems, Oldenbourg, 1998
- Scherff, B., Haese, E., Wenzek, H.R.: Fieldbus systems in practice, Springer, 1999

Course: Automation Engineering Laboratory
EDP designation: NN, (EITB612A, German course)
Lecturer(s): Prof. Dr. Philipp Nenninger
Scope (SWS): 2
Cycle: Summer semester
Type, mode: laboratory, compulsory subject
Teaching language: English
Contents: Try to: • Modeling of technical processes • Scaling, normalization and filtering of process variables • Design and implementation of process control solutions with integrated control and regulation functions • Use of systems for operation and monitoring of processes (SCADA systems) • Communication via various fieldbus systems • Test strategies and test aids for process coupling
Recommended reading: • Seitz, M.: Programmable logic controllers, Fachbuchverlag Leipzig, 2003 • Wellenreuther; Zastrow: Automatisieren mit SPS, Vieweg 2001, (ISBN 3-528-03910-8) • Berger, H.: Automation with STEP 7 in IL and SCL, Siemens ed. Publicis Corporate Publishing, (ISBN 3-89578-197-5) • Braun, W.: Programmable logic controllers in practice, Vieweg, 1999 • Borucki, L.: Digital Technology, Teubner, (ISBN 3-519-36415-8) • Hertwig, A.; Brück, R.: Entwurf digitaler Systeme, Hanser, (ISBN 3-446-21406-2).