

Modulbeschreibung

Fabrication and Test of (Micro-) Electronic Circuits

Allgemeine Informationen

Modulbezeichnung

Fabrication and Test of (Micro-) Electronic Circuits

Modulkategorie

Fachliche Vertiefung

Modulverantwortlicher

Paul Zbinden, Tobias Lamprecht

Anzahl der Credits

3

Durchführungssetting

Campus	<input checked="" type="checkbox"/> Buchs (Fabrication)	<input checked="" type="checkbox"/> Rapperswil-Jona (Test)	<input type="checkbox"/> St. Gallen
Online Teilnahme	<input checked="" type="checkbox"/> keine Onlineteilnahme möglich	<input type="checkbox"/> hybrid	<input type="checkbox"/> ausschliesslich online
Durchführung	<input type="checkbox"/> wöchentlich	<input checked="" type="checkbox"/> als Blockwoche	<input type="checkbox"/> nach Absprache

Ziele, Inhalt und Methoden

Lernziele, zu erwerbende Kompetenzen

In this seminar you will gain an insight into how integrated circuits are manufactured, how electronic modules are created from individual components and which methods are mainly used to test circuits and systems. The entire course takes place as a block course and includes both theory and lab, where you will study the practical realization, characterization and testing of an electronic system. You will manufacture a simple integrated circuit yourself in a clean room, then assemble the elements into a module and validate all components with the test programs you have previously designed.

Modulinhalt

Theorie:

- Test process and test equipment
- Fault modelling
- Logic and fault simulation
- Test methods, such as IDDq, scan, BIST, analog test
- Basics on MEMS (micro-electro mechanical systems) and semiconductor fabrication processes: photolithography, ion-implantation, thin-film coating, etching
- Various analysis techniques for MEMS and semiconductors: Scanning electron microscope, optical microscope
- Packaging of electronic devices

Project: Design, fabrication, and test of a mixed analog / digital circuit (Test in Rapperswil, Fabrication Buchs)

- A simple flow sensor is manufactured in the microtechnology fabrication center (clean room) and assembled with other electronic components to form a system. This, during three days of hands-on experience in microtechnology in Buchs.
- The overall system and its subcomponents are designed in advance and prepared for testability. After manufacturing, the system is tested with your test program according to the methods developed in theory.
- You will be using modern design and test equipment.

Lehr- und Lernmethoden

Seminar / Workshop

Seminar will take place as a block module in the two weeks before the Semester. First time: KW36 / 37, 2022.

Limited number of attendees to assure the hands-on experience for each student

Voraussetzungen, Vorkenntnisse, Eingangskompetenzen

Bachelor in Elektrotechnik, Systemtechnik, Photonik, or similar

Bibliografie

- Essentials of Electronic Testing: Michael L. Bushnell, Vishwani D. Agrawal, Kluwer Academic Publishers.
- Streetman, Ben G, and Sanjay Banerjee. Solid State Electronic Devices, 7th Ed., ISBN-13: 9780133496802, Upper Saddle River, N.J: Prentice Hall, 2015.

Leistungsbewertung

Prüfungsart

Oral exam, 20 min

Zulassungsbedingungen

- Attendance and active participation in the courses offered.
- Project carried out until the module test.

Prüfungsdauer

Oral exam: 20 Min

Hilfsmittel

Open Book