

ISCD – Integrated Systems and Circuits Design

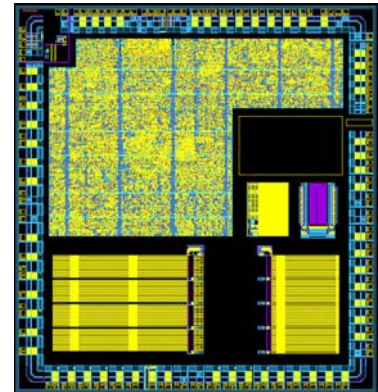
Master Degree Program

General Information

Integrated electronics has been the main technology driver over the past decades. With the availability of very deep sub-micron CMOS manufacturing technologies enabling gigascale integration this will provide new opportunities for applications like personal communication and computing, however, also challenges to the development of such integrated systems. Design engineers who master the complexity of integrated systems and have a broad understanding in technology and devices are required in industry.

The objective of this graduate curriculum is to generate special skills in the following three working areas of microelectronics:

- System solutions
System and VLSI architectures, system on chip (SoC) and system in package (SiP) for communications, embedded systems, modeling
- Integration
Fabrication technology, analog and digital VDSM-circuit design, sensors and power electronics for automotive applications
- Design methodology
Use of modern CAD tools, modeling and verification, HDLs – hardware description languages



The curriculum offers 2 semesters of mandatory courses and allows specialization in the more analog or digitally dominated domain through elective courses in semester 3 and a thesis work which is accompanied by seminars with presentations and technical discussions, in semester 4.

The practical aspect of this master degree program is emphasized by a project module, spanning semester 1 to 3. With first preparations during semester 1, students design an integrated circuit in small teams and implement a testchip during semester 2. After fabrication of the testchip, samples will be available in semester 3 for evaluation in the lab using state of the art test equipment.

The typical graduate will be working for integrated circuit manufacturers, fab-less foundries, design houses or suppliers of system solutions using VLSI components. Target employers will be Austrian and international companies. The scope of duties will be concept engineering, modeling, design, verification, test and product engineering of analog, digital and mixed-signal integrated circuits. This includes the support of applications engineering (e.g. PCB design), evaluation (lab) and test (production).



Duration: 4 semesters, 120 ECTS

The academic degree *Master of Science in Engineering* will be earned with the successful completion of ISCD. This degree qualifies for PhD studies at universities.

Several high tech companies and a microelectronic cluster are located in the area.

Contact:

Fachhochschule Kärnten, Carinthia University of Applied Sciences, Engineering&IT

Europastrasse 4

A-9524 Villach, Austria

Tel: +43 5 90500 2002

Fax: +43 5 90500 2110

Email: engineering-it@fh-kaernten.at

Web: <http://www.fh-kaernten.at/iscd>

Location: Villach, Austria

Villach has 57.000 inhabitants and is located on the river Drau in the south of Austria, close to both Italy and Slovenia. The town, which is surrounded by magnificent mountains and lakes, offers all kind of outdoor activities and is known for the high quality of its cultural events.

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Course Modules

Both semesters of the first year offer 30 ECTS of mandatory courses in the modules *Basics & Technology*, *Design Methodology*, *Integration 1*, *System Solution* and the *Project*. Beside mandatory courses (10 ECTS), the 3rd semester offers a selection of courses in modules *System Solution* and *Integration 2* and *Special Topics*, from which courses with the amount of 20 ECTS have to be selected.

Mandatory Courses		ECTS	Semester
Basics & Technology	Basics in Systems and Circuits Theory	2.5	1
	Integrated Circuit Technology	3	1
Design Methodology	Introduction to Computer Aided Design	6	1
	Computer Aided Design	3	2
	Digital Design with HDL	7.5	2
Integration 1	Design of Digital Integrated Circuits	6	1
	Design of Analog Integrated Circuits	7.5	1
	Advanced Topics in Analog Integrated Circuits	7.5	2
	Testing on Integrated Circuits	4.5	3
System Solution	System Modeling and Verification - Digital	4.5	2
	System Modeling and Verification - Analog	3	3
Project	Introduction to Project	3	1
	IC Design and Implementation	5.5	2
	IC Evaluation	2.5	3
Foreign Language	Foreign Language - 1	2	1
	Foreign Language - 2	2	2

Elective Courses

System Solution	Arithmetic Modules for VLSI/SoC Design	5	3
	System-on-Chip Architectures	5	3
Integration 2	Integrated Data Converters	5	3
	Advanced Topics in Digital Integrated Circuits	5	3
	Analog & Mixed-Signal ICs for Communication Systems	5	3
	Integrated Sensors for Automotive Applications	5	3
Special Topics	Special Topics in VLSI/SoC/SiP Design 1	5	3
	Special Topics in VLSI/SoC/SiP Design 2	5	3

Thesis

Thesis	Master Thesis and Seminar	30	4
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Application Requirements

The BSc in Electronics Engineering or a comparable IT program (180 ECTS) is required. A minimum of 30 ECTS (equivalent to one semester) has to be achieved in the following subjects:

- Analog and digital electronic circuits design
- Electronic components
- Modeling of circuits and systems (e.g. VHDL, Verilog, ...)
- Analog and digital signal processing
- Computer architecture and microprocessor technology
- Use of CAD tools (e.g. Matlab, Spice, ...)

Applicants whose native language is not English are required to prove communication skills e.g. by IELTS, TOEFL, UCLES or equivalent.