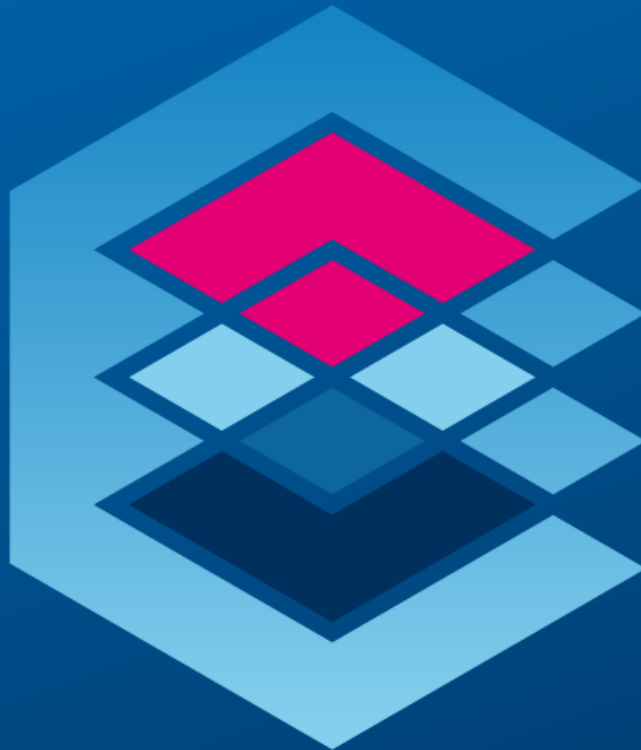




Deutsche Telekom Chair of Communication Networks
Technische Universität Dresden

Professor Dr.-Ing. Dr. h.c. Frank H.P. Fitzek

Software Engineering

Winter Semester 2025/2026



Teaching – 10 lecture series

ComNets 1	ComNets 2	ComNets 3
Smart Grid	Network Coding	Cooperative Communication
Software Engineering	Queuing Theory	Statistics 1/2
Hauptseminar	Oberseminar	Problem Based Learning

PhD Students finished: 23
PhD Students ongoing: 70+

Bachelor Students finished: 59
Master Students finished: 13
Diplom Students finished: 53

Student Helpers currently: 6

Introduction to Course Software Engineering

Software Engineering Grundlagen

After completing the module, students have competencies and practical skills in dealing with various programming languages and programming environments. The module focuses on the structure and programming of computers with Python and Assembler. This includes information representation, basic Boolean circuits, computer architecture, algorithms and their complexity analysis, i.e. Big O notation.

Course in OPAL

At a glance

Module Number: Eul-ET-C-SwEgG

Type: compulsory course

Semester: 1st Semester ET

Term: annually in winter semester

Language: German (material in English)

Extent: 2/1/1

Exam: written, 120 min

Credits: 5

Lecturers and Teaching Assistants



Prof. Dr.-Ing. Dr. h.c. Frank
H. P. Fitzek

Head of the Chair



Dr.-Ing. Roland Schingnitz

Postdoctoral Researcher, Lecturer



Dr.-Ing. Stanislav
Mudrievskyi

Postdoctoral Researcher, Lecturer



Dr.-Ing. Juan A. Cabrera

Postdoctoral Researcher, Lecturer



Introduction to Course Software Engineering

Time Table		open legend
15/10/2025 13:00 – 14:30	L1 – Introduction Prof. Frank Fitzek	HÜL S386 E
15/10/2025 14:50 – 16:20	Tutorial – Software installation Dr. Stanislav Mudrievskiy	BAR SCHÖ E
16/10/2025 9:20 – 10:50	L2 – Loops Prof. Frank Fitzek	ABS 0E11 H
22/10/2025 13:00 – 14:30	L3 – Coupon collector's problem Prof. Frank Fitzek	HÜL S386 E
22/10/2025 14:50 – 16:20	L4 – Introduction to Raspberry Pi Pico Prof. Frank Fitzek, Dr. Roland Schingnitz	BAR SCHÖ E
23/10/2025 9:20 – 10:50	L5 – Fibonacci sequence, recursion Prof. Frank Fitzek, Dr. Juan Cabrera	ABS 0E11 H
29/10/2025 13:00 – 14:30	E1 – Input, output, math library Dr. Stanislav Mudrievskiy	HÜL S386 E
29/10/2025 14:50 – 16:20	E2 – Input, output, if statement, boolean logic Dr. Stanislav Mudrievskiy	BAR SCHÖ E
30/10/2025 9:20 – 10:50	L6 – Bubble sort Prof. Frank Fitzek	ABS 0E11 H
05/11/2025 13:00 – 14:30	L7 – UDP communication over WiFi Prof. Frank Fitzek	HÜL S386 E
05/11/2025 14:50 – 16:20	L8 – Object-oriented programming: library Prof. Frank Fitzek	BAR SCHÖ E
06/11/2025 9:20 – 10:50	E3 – Loops: while, for, arrays (lists) Dr. Stanislav Mudrievskiy	ABS 0E11 H
12/11/2025 13:00 – 14:30	E4 – Functions, execution time, Pico Dr. Stanislav Mudrievskiy	HÜL S386 E

12/11/2025 13:00 – 14:30	E4 – Functions, execution time, Pico Dr. Stanislav Mudrievskiy	HÜL S386 E
12/11/2025 14:50 – 16:20	L9 – Practical examples in MicroPython for Raspberry Pi Pico Dr. Roland Schingnitz, Jonas Schulz	BAR SCHÖ E
13/11/2025 9:20 – 10:50	L10 – Object-oriented programming: game theory Prof. Frank Fitzek	ABS 0E11 H
19/11/2025	No lecture – Public holiday	
20/11/2025 9:20 – 10:50	L11 – Problem based learning Prof. Frank Fitzek	ABS 0E11 H
26/11/2025 13:00 – 14:30	L12 – Raspberry Pi Pico architecture 1 Dr. Stanislav Mudrievskiy	HÜL S386 E
26/11/2025 14:50 – 16:20	E5 – Q&A to lab1 Dr. Roland Schingnitz, Jonas Schulz	BAR SCHÖ E
27/11/2025 9:20 – 10:50	E6 – Read from / write to files Dr. Stanislav Mudrievskiy	ABS 0E11 H
03/12/2025 13:00 – 14:30	L13 – Digital transfer, AI, machine learning, consultation, Q&A Prof. Frank Fitzek	HÜL S386 E
03/12/2025 14:50 – 16:20	L14 – Raspberry Pi Pico architecture 2 Dr. Stanislav Mudrievskiy	BAR SCHÖ E
04/12/2025 9:20 – 10:50	L15 – Raspberry Pi Pico architecture 3 Prof. Frank Fitzek, Dr. Stanislav Mudrievskiy	ABS 0E11 H
10/12/2025 13:00 – 14:30	E7 – Q&A to lab2, lab3 Dr. Stanislav Mudrievskiy	HÜL S386 E
10/12/2025 14:50 – 16:20	E8 – Q&A to lab2, lab3 Dr. Stanislav Mudrievskiy	BAR SCHÖ E
11/12/2025 9:20 – 10:50		ABS 0E11 H

OPAL

- Bitte alle Studenten in OPAL eintragen
- Link steht (oder kommt) auf der Webseite
- Wir benutzen OPAL
 - um mit den Studenten im Kontakt zu bleiben
 - Materialien
- Jeder Student im OPAL bekommt einen eigenen Raspberry PI Pico plus Hardware

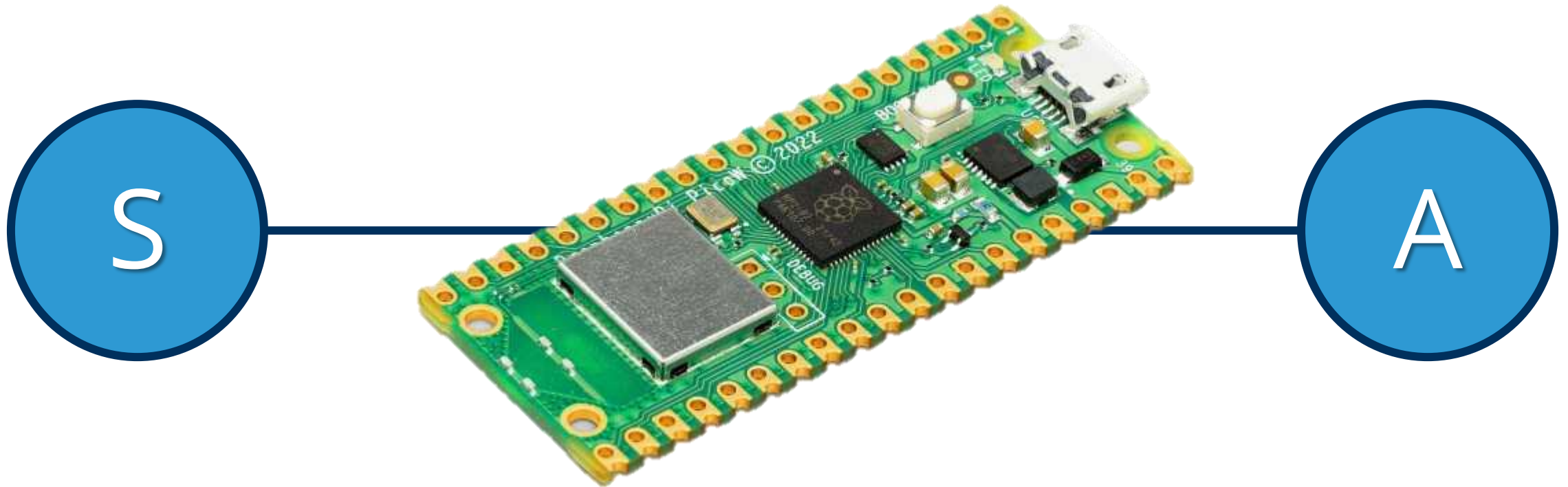
Goal of the Lecture

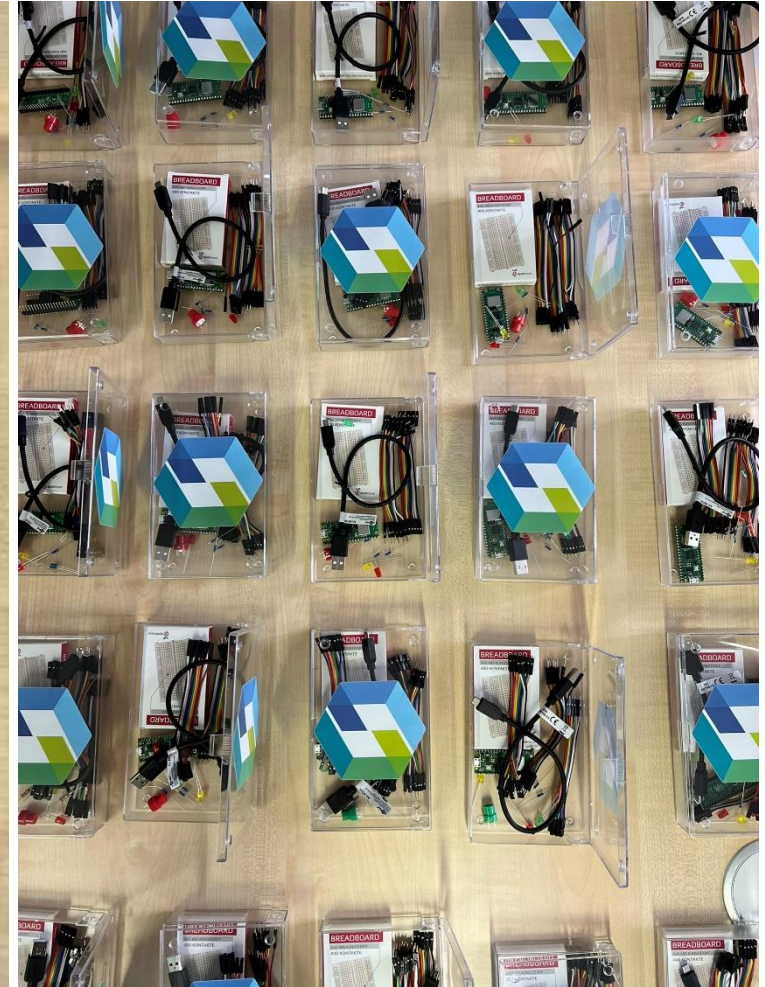
Basic Programming	Algorithms and Complexity	Programming of Embedded Devices	Computer Hardware and Fundamentals
<i>(You will learn to program!)</i>	<i>(You will learn to program <u>efficiently</u>!)</i>	<i>(You will learn to interact with the outer world!)</i>	<i>(You will learn where your programs run!)</i>
Installation of IDE	Coupon Collectors's Problem	Introduction to Raspberry Pi Pico	Computer Architecture Turing vs. Von Neumann
Loops and Conditionals	Fibonacci, Recursion	UDP Communication over WiFi	Halting Problem
I/O	Bubble Sort	Practical examples in MicroPython for Raspberry Pi Pico	Transistor → Logic gate → 4-bit adder → 8-bit breadboard
Basic: binary, logic, etc.	Pointers	Raspberry Pi Pico architecture 1	
		Raspberry Pi Pico architecture 2	
		Raspberry Pi Pico architecture 3	

Programming Language

- Python
- MicroPython
- Problem Based Learning
- Praktikum / Labs
 - More info in our meetings and web pages

Was bedeutet das für die Vorlesung?



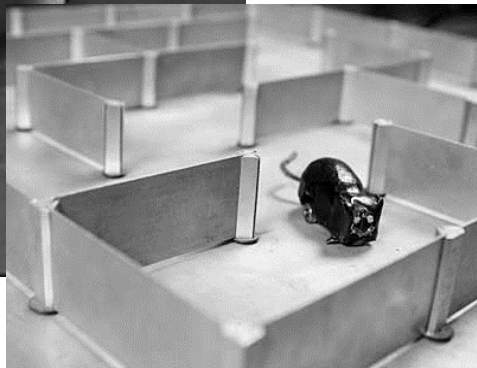


Python (2 Vorlesungstermine)

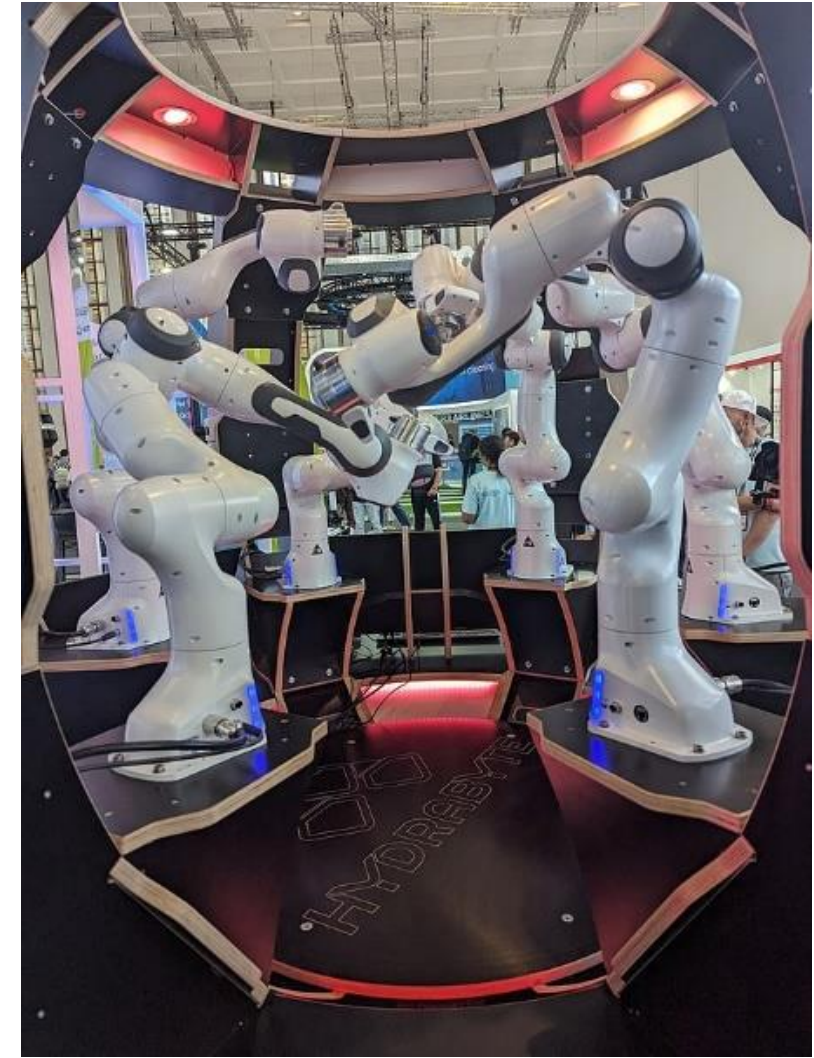
- 1 Vorlesung “Fun with Frank & Juan” – Panini Album
- 1 Vorlesung “CeTI with Frank & Juan”
- Studenten brauchen eine Python Programmierumgebung
 - PyCharm (inbuild Python)
 - Linux
 - <https://www.programiz.com/python-programming/online-compiler/>
 - <https://jupyter.org/try-jupyter/lab/>
 - Whatever works
- Eigenen Rechner mitbringen (wichtig!!!)



Claude Shannon



Robotics



Boston: Northeastern University and Boston Dynamics

