Technische Universität Berlin

Rechnernetze und Verteilte Systeme / Computer Networks

Course Organization

Telecommunication Networks (TKN)

Professor

- Prof. Dr.-Ing. habil. Falko Dressler

Emeritus Professor

- Prof. Dr.-Ing. habil. Adam Wolisz

Senior Researchers

- Dr. Jorge Torres Gómez
- Dr. Anatolij Zubow

Team assistant

- Petra Hutt

Lab engineer

- Georgios Ainatzes
- Ahmad Farhad Shams

Scientific Staff

- Joana Angjo
- Jamshid Bacha
- Osman Tugay Başaran
- Sigrid Dimce
- Dr. Doğanalp Ergenç
- Julian Heinovski
- Dr.-Ing. Agon Memedi
- Fabian Missbrenner
- Marie-Christin H. Oczko
- Dr. Saswati Pal
- Atefeh Rezaei
- Sascha Rösler
- Max Schettler
- Lukas Stratmann
- Dr. Rathinamala Vijay
- Ziqi Zhou

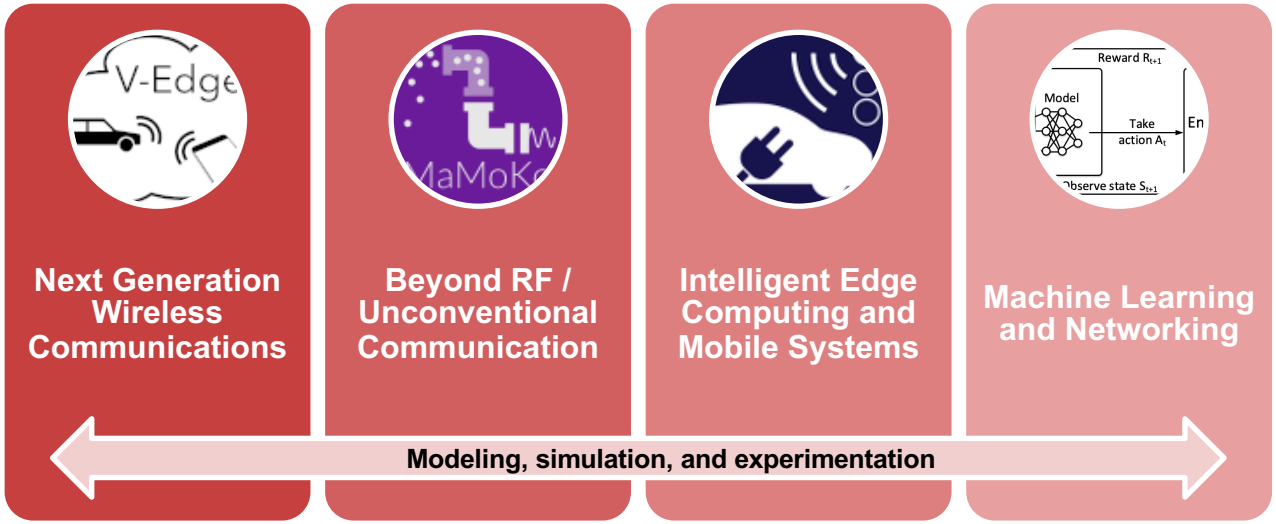
External PhD Candidates

- Kai Lennert Bober
- Laura Finarelli
- Mohammad Bariq Khan
- Mengfan Wu

Student Research Assistants

- Aikaterini Kerani
- Jonas Kuss
- Christos Laskos
- Lorenz Pusch
- Simon Schmitz-Heinen

Research Focus



DFG Deutsche Forschungsgemeinschaft

Federal Ministry of Education and Research

Federal Ministry for Economic Affairs and Climate Action

DAAD

European Commission

TOYOTA InfoTech Envisioning Mobility

HUAWEI

vmware

dSPACE

山东大学（青岛） Shandong University, Qingdao

UCLA

FAU Friedrich-Alexander Universität Erlangen-Nürnberg

Politecnico di Torino

Northeastern University

Telecommunication Networks Group

Instructors

- Lecture
  - Falko Dressler, supported by Anatolij Zubow
- Labs and homework assignments
  - Julian Heinovski
  - Marie-Christin Oczko
  - Max Schettler
  - … und (viele) Tutoren

Computer Networks

- Last part of the introduction to computer engineering
  „Technische Grundlagen der Informatik“

  ➔ *Rechnerarchitektur*

  ➔ *Systemprogrammierung/Betriebssysteme*

  ➔ ***Rechnernetze und Verteilte Systeme / Computer Networks***

  followed by

  ➔ ***Rechnernetze Ergänzung (to be re-named Communication Networks)*** *or*

  ➔ *Verteilte Systeme*

- There is no disconnected system anymore …

Objectives

- Fundamental knowledge about **Computer Networks** and **Internet Technology**
- Understanding of the **Principles** of networked systems
- Understanding of **Architectures, Principles, and Organization** of computer networks using typical Internet protocols as a blueprint

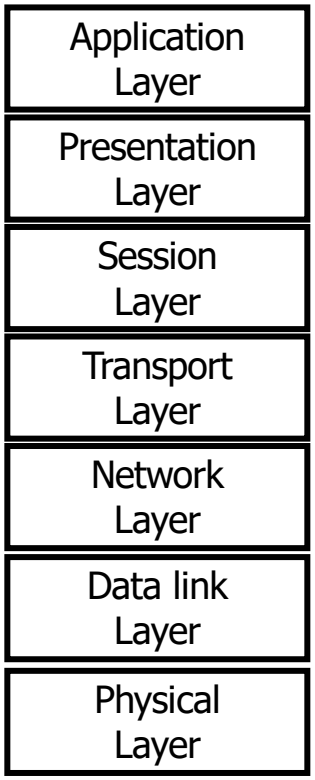
- Almost all material provided is in English
  - To help understanding relevant literature
  - To prepare for exchange semester and Master studies
  - To prepare for most jobs in very international teams

  … we will still talk in German

Chapters

1. Introduction
2. Protocols
3. Application layer
4. Web services
5. Distributed hash tables
6. Time synchronization
7. Transport layer
8. UDP and TCP
9. TCP performance
10. Network layer
11. Internet protocol
12. Data link layer

Top-Down-Approach



Teaching methodology

- Lecture
  - Conveys **fundamental concepts**
  - It is **absolutely necessary** to deepen the knowledge using the available **literature**
  - Please **take notes**, e.g., in the provided slides
- Tutorials
  - **Recap relevant theory** from the lecture
- Quizzes
  - Review of **learning progress**
- Labs
  - Engineers need **hands-on experience**
  - Mostly programming exercises

Semester Schedule

Woche	Datum VL	Thema VL	Tutorium	Quiz	Praktikum
42	18.10.	Introduction	-		Projekt 0
43	25.10.	Protocols	Intro / Sprechstunde 0		Projekt 0
44	1.11.	Application layer	Theorie 1		Beginn Projekt 1
45	8.11.	Application layer	Sprechstunde 1		Projekt 1
46	15.11.	Web services	Theorie 2		Projekt 1
47	22.11.	Distributed hash tables	Sprechstunde 1	Quiz 1	Projekt 1
48	29.11.	Time synchronization	Theorie 3		Abgabe Projekt 1
49	6.12.	Transport layer	Sprechstunde 2		Beginn Projekt 2
50	13.12.	Transport layer	Theorie 4		Projekt 2
51	20.12.	UDP and TCP	Sprechstunde 2	Quiz 2	Projekt 2
2	10.1.	TCP performance	Theorie 5	Quiz 3	Projekt 2
3	17.1.	TCP performance	Sprechstunde 2		Abgabe Projekt 2
4	24.1.	Network layer	Theorie 6		Beginn Projekt 3
5	31.1.	Internet protocol	Sprechstunde 3		Projekt 3
6	7.2.	Internet protocol	Theorie 7?	Quiz 4	Projekt 3
7	14.2.	Data link layer	Sprechstunde 3		Abgabe Projekt 3

- Most up-to-date version on ISIS

Labs

- Tasks
  - 3 tasks
  - Every task is graded
- Grading
  - Mostly automated
  - All tests need to pass
  - **We use a plagiarism checker!**

- **Remark**
  - Please use the time before the course and in the first week to update your C programming skills
  - **We cannot provide a C class!**

Lab/Tutorial Schedule

Zeit	Montag	Dienstag	Mittwoch	Donnerstag	Freitag
08-10	T01 HFT-TA 340 Oliver	T05 (en) MAR 6.001 (PC-Pool) Ayse	Vorlesung HE 101	T09 MAR 6.001 (PC-Pool) Leon	T18 MAR 6.001 Oliver
10-12	T02 HFT-TA 340 Oliver			T10 MAR 6.001 (PC-Pool) Thomas	T19 HFT-TA 340 Oliver
12-14	T03 MAR 6.001 (PC-Pool) Oliver	T06 HFT-TA 340 Ayse	T15 HFT-TA 340 Oliver	T11/T16 MAR 6.001/TEL 106 Laszlo/Oliver	T13 HFT-TA 340 Jonas
14-16	T04 MAR 6.001 (PC-Pool) Oliver		T07 MAR 6.001 (PC-Pool) Leon	T17 HFT-TA 340 Oliver	T14 MAR 6.001 (PC-Pool) Jonas
16-18			T08 MAR 6.001 (PC-Pool) Thomas	T12 TEL 106 li Laszlo	T20 MAR 6.001 Oliver

- Most up-to-date version on ISIS

Exams

- Portfolio exam
  - 2 (out of 4) online tests to review learning progress (ISIS, 10 points, each)
  - 3 tasks in the labs (10 points, each)
  - Final exam (50 points)

- Registration to the exam
  - Via MOSES
  - **Deadline: 5.11.2023 (no exceptions)**

Quizzes and final exam

- Quizzes
  - Dates: see ISIS
  - Open book (but NO collaboration!)
  - Some quiz questions are super easy, other are on purpose phrased to make you think about what you studied
  - Topics covered: see ISIS page (we will list the covered chapters about a week before the quiz)

- Written final exam
  - Dates: see ISIS
  - You can bring a calculator (without wireless communication link) and an A4 cheat-sheet (handwritten, not copied or printed)
  - Topics covered: all chapters of this class

Do's and Dont's

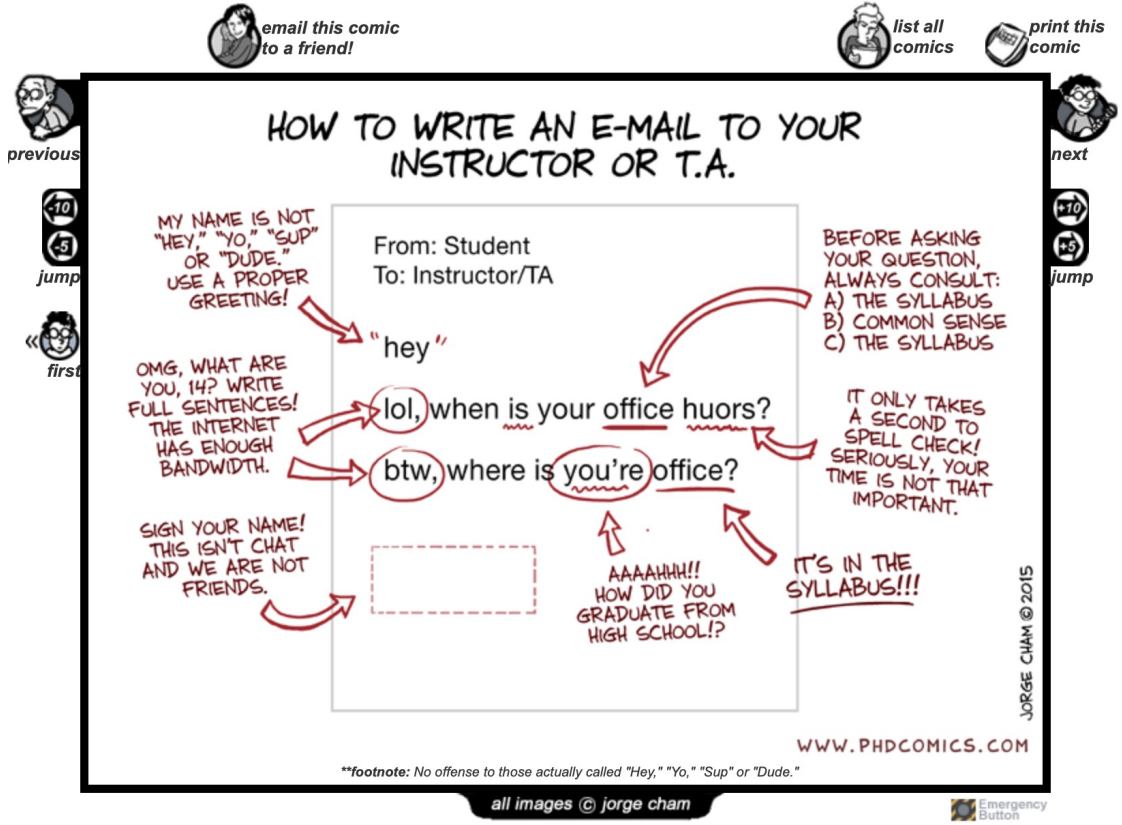
- Never ever
  - Harassment or discrimination of any kind
    - If you experience any such situation, please talk to me, or escalate the issue to our gender diversity team or the dean of our school
  - Plagiarism of any kind
    - Copying without referencing is not acceptable

      → course will be marked as fail + report to the examination office

- Always at any time
  - Question everything – there is no such thing such as a stupid question
    - Use the opportunity and ask questions if something is not clear
    - Lecturers, assistants, tutors
  - Networking – you are stronger in a group than alone
    - Particularly to prepare for tests and exams

Working as a team

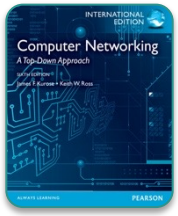
- We are here to help you
  - This is a big class, please help us helping you



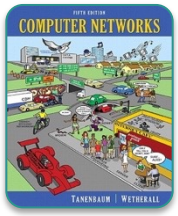
- Channels and procedures
  - ISIS forums for all discussion topics
  - Please help answering questions by your peers
  - Please avoid “+1” comments or re-post questions already discussed

- Let’s **work as a team** to **focus on content** rather than administration ☺

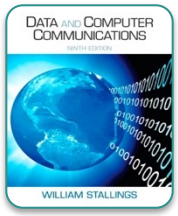
Literatur und weitere Informationen



J. F. Kurose and K. W. Ross, **Computer Networking: A Top-down Approach**, ed. 6th, Boston, Pearson, 2012



A. S. Tanenbaum and D. J. Wetherall, **Computer Networks**, ed. 5th, Prentice Hall, 2011



W. Stallings, **Data and Computer Communications**, ed. 10th, Pearson, 2014

News, updates, handouts, …
ISIS: https://isis.tu-berlin.de/course/view.php?id=34749