Algorithms and Deduction
Welcome Event Summer 19

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Algorithms & Complexity group
All information is
- subject to change and **tentative**, 
- subject to being **incomplete**, and  
- subject to being **wrong**.
Important basics

Bachelor theory courses taught at Technische Universität Kaiserslautern:

- **Logic and Semantics of Programming Languages**  
  (f.k.a. Logic)

- **Formal Languages and Computability**  
  (f.k.a. Formal Foundations of Programming, FGDP)

- **Algorithms and Data Structures**  
  (f.k.a. Design and Analysis of Algorithms, EAA)
AG Automated Reasoning (Lin)
Courses AG Lin

- **Concurrency Theory** (WS19/20) 4V+2Ü
- **Automated Reasoning** (SS20) 4V+2Ü
- **Logic and Verification** (seminar) every semester 2S
Concurrent models of computation
(i.e., the theory of parallelism)

Some questions:
- Which concurrent models are decidable?
- How do you use concurrent models to reason about concurrent programs?

Contents:
- Multi-threaded programs and Petri nets
- Static networks and lossy channel systems (lcs)
- Reconfigurable networks and process algebras
- GPU Programs and Bulk synchronous model
Automated Reasoning

**Topic:** Automated Reasoning  
(e.g. automated theorem proving)

**Questions and contents:**
- How to use formal logic to represent programs?  
- How do we design the right logic to allow automated reasoning?  
- Techniques used by modern Sat and SMT solvers  
- First order theories, algorithmic model theory, and automata based algorithms
AG Algorithm Accountability
(Zweig)
Courses AG Zweig

- **Data Science Literacy**  WS19/20  V3+3Ü
- **Network Analysis**  (Project)
- **Big Data Analytics**  (tbd)  ????
AG Embedded Systems (Schneider)
Lectures AG Schneider

- **Verification of reactive systems** (always summer) 4V+2Ü
- **Applied Verification** (project) 2P
AG Algorithms and Complexity
(Schweitzer)
Lectures AG Schweitzer

- **Complexity Theory** (usually in winter) (WS19/20) 4V+2Ü
  [sometimes taught by Prof. Majumdar]

- **Algorithms** (seminar) every semester 2S

Irregular courses

- Algorithms and Symmetry (next time pending) 4V+2Ü
- Algorithmic Group Theory (next time pending) 4V+2Ü
Max Planck Institute for Software Systems MPI SWS
MPI SWS Lectures

- Program Analysis (Christakis, Darulova, Neider) (WS19/20) 4V+2Ü
- Advanced automata theory (Neider/Majumdar?) (SS20?) 4V+2Ü
- Concurrency Theory (Lin, Neider, Zufferey) (WS19/20) 4V+2Ü

- Verification (project) (Neider, Schneider, Zufferey) WS 2019/20 2P

- Research Topics in Software Reliability (seminar) (Christakis) (WS19/20) 2P
Program Analysis

**Topic:**
Automatic analysis of programs

**Contents:**
- Term rewriting and programming languages
- Lattice theory and static analysis
- Tree automata and XML
Other lecturers
Further courses

- replication and consistency (Bieniusa) (WS19/20) 2V+1Ü

Numerous interesting lectures offered in the math department:

- Polyhedral Theory and Algorithms (Krumke/Ruzika) (WS19/20) 4V+2Ü
- Advanced Network Flows and Selfish Routing (Krumke MATH) (WS19/20) 4V+2Ü
- Probability and Algorithms (Küfer MATH) (WS19/20) 4V+2Ü
- Nonlinear optimization (??? MATH) (SS20) 4V+2Ü
- Theory of scheduling problems (?? MATH) (SS20) 4V+2Ü

Other courses sometimes taught:
Graphs and Algorithms, Online Optimization, Robust Optimization, Game Theory, Cryptography, (Advanced Algorithms), etc.