LOGIC and SETS

Formale Systeme

3VO + 2PS

Lecturer: Ana Sokolova

Instructions: Ana Sokolova
                   Sebastian Arming
                   Elmar Eder

http://cs.uni-salzburg.at/~anas/FormaleSysteme2020/

http://cs.uni-salzburg.at/~anas/FormaleSystemeProseminar2020/

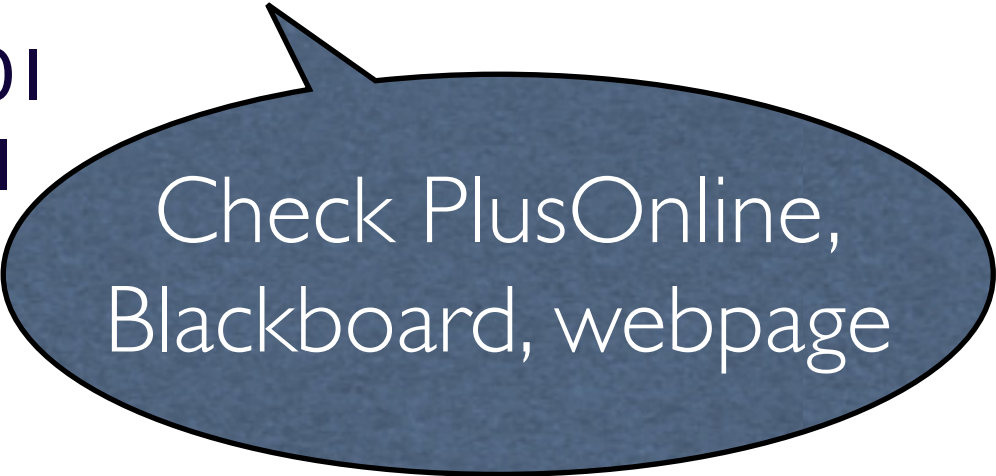# Schedule and Rules

- **Lectures** Monday 2:15 pm - 3:00 pm in T01
  Thursday 10:15 am - 12 am in T01

- **Instructions**
  Group 1, Thursday 1:15 pm - 3 pm (AS) in T01
  Group 2, Thursday 3:15 pm - 5 pm (AS) in T01
  Group 3, Thursday 1:15 pm - 3 pm (SA) online (and T02)
  Group 4, Thursday 3:15 pm - 5 pm (EE) in T02

- **Tutors** Alexander Loitzl and Emanuel Petter
  Day and room t.b.a

- **Books**
  Logical Reasoning: A First Course by R. Nederpelt and F. Kamaraddine

  How to Think Like a Mathematician by K. Houston

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Instructions (PS)

- Instruction exercises in Blackboard on Thursday evenings

- To be solved by the students (ideally alone)

- In class we will have a small test every week except the first week (1 simple exercise)
and then present solutions/discuss the exercises
(sometimes students will be asked to present)

- Different in the online group — homework (instead of test) via Blackboard

Instructions (PS) grading

- The test/homework exercise will be graded each week

- The graded exercise will be returned to you in class (with feedback) one week later, or online in Blackboard

- Grade based on
  (1) the grades of the test/homework exercises and
  (2) activity in class (ability to present solutions)

- All information about the course / rules / exams / grading is / will be on the course webpage and PlusOnline

Lecture (VO) Exam

- Written exams

- Written exam in February, April, and July
  or two partial tests during the semester

- Grade based on the # of points on the written
  exam (or sum of the points on the partial tests)

- For better grade oral exam after the written one
  upon appointment

- You pass the course if you have 55% of the
  maximal points on the exam.

Partial Tests (VO)

- One test end of November, one beginning of February

- The tests are partial (half material)

- You pass via tests if the sum of your points on both tests is at least 55% of the sum of maximal points on the tests and if on each test you have at least 20% of the maximal points

- The tests and the exams consist of exercises / questions related to the material taught in class

- We will implement some registration for the tests

Presence

- Presence is obligatory in the PS not in the VO

- You may miss up to 1 week of PS classes, for anything beyond that a justification is needed

- Whenever you are ill / have a cold, please join the online PS group and the online VO classes — do not come to the university please. Email your PS instructor for approval and the link for the online meeting.

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in Corona-times, online presence counts

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Teaching and Studying in Corona Times

- Both challenges and opportunities

- Things may change on short notice

- Be adaptive

- Be considerate

Our VO classes will be "hybrid".
Up to 28 students will be present in the classroom.
The remaining students will participate online.

Teaching and Studying in Corona Times

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we will setup Blackboard groups for each week to which you can register

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The Online Mode (VO)

- Offline online means: Videos will be made available to you every week (ready to watch on Thursdays 10-12, without us meeting them).

- In addition we will have an online online :-) hour of Webex meeting (to be scheduled) for discussion / questions related to the video materials.

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Plan B

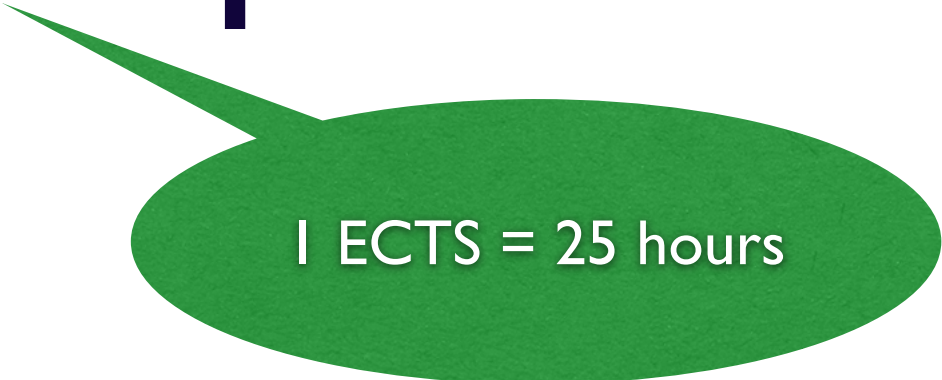In case of further corona-related problems

Everyone participates online.

Important Webex Information

- If trying to access Webex via Blackboard causes errors, we suggest to alternatively log in via https://uni-salzburg.webex.com/ directly.

- Students of the mini-curriculum CS-for-all "Informatikkompetenz für alle" are invited to register via e-mail to ifa@cs.sbg.ac.at.

Some advice

- It starts easy, but soon it gets more difficult

- There accumulates lots of material for the exam

- Best is to regularly study, practice, solve the exercises yourself!

ECTS points

1 ECTS = 25 hours

- 3 ECTS for the lectures (VO)

- 4 ECTS for the instructions (PS)

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app, 10 hours a PS week :-)

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better: I week before exam (40 hours) + 7 hours a PS week

app, 10 hours a PS week :-)

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Goals:

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At the end of the course, you will be able to:

Goals:

- **Read** - formal mathematical statements, proofs

- **Write** - formal mathematical statements

- **Manipulate** - logical formulas
  - basic notions of set theory

- **Prove** - properties in basic set theory,
  - tautologies

- **Argue** about validity and truth

- **Understand, construct, reason about** - basic models of computation (finite automata)

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Image source: Springer

We will learn

- Logical Calculations - propositional logic, predicate logic

- Logical Derivations - reasoning, natural deduction

- Naive Set Theory - sets, relations, mappings, numbers and structures, ordered sets

- Basics of formal models - finite automata, transition systems, graphs, grammars...

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starting next week

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What is logic ?