Course Overview

Introduction to Engineering Mathematics

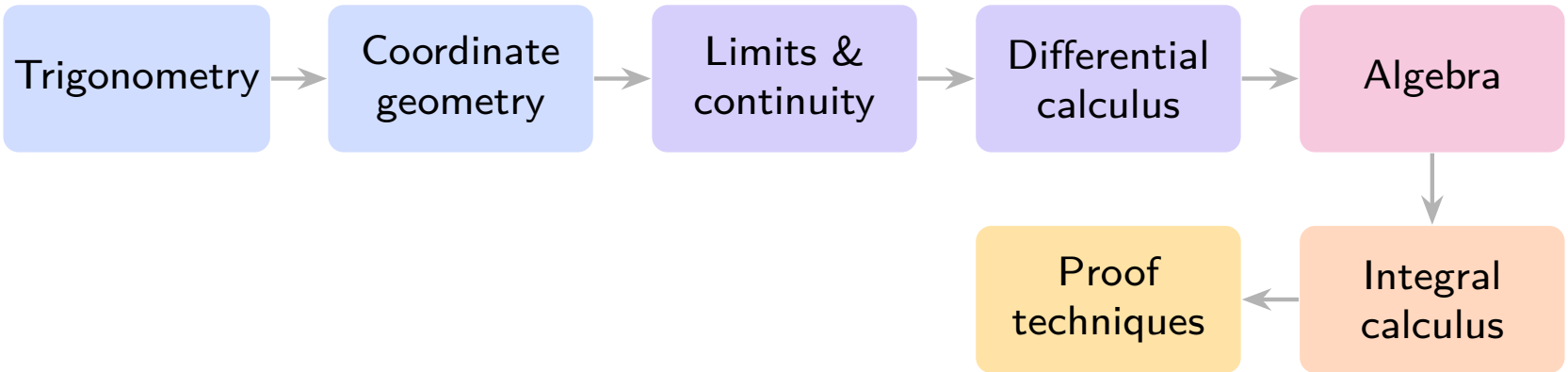
Prof. Joris Vankerschaver

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Practical information

Course content



- Some of you may have seen some (or all) of this material before.
- For most of you, however, it will be the first time to see the material in English.
- The way of teaching and examining at GUGC is also different from what you may be used to.

Course schedule

Theory lectures

- Wednesday and Friday, 8:30–9:45
- AB 404, Gh 102

Exercise sessions

- Mondays, see schedule

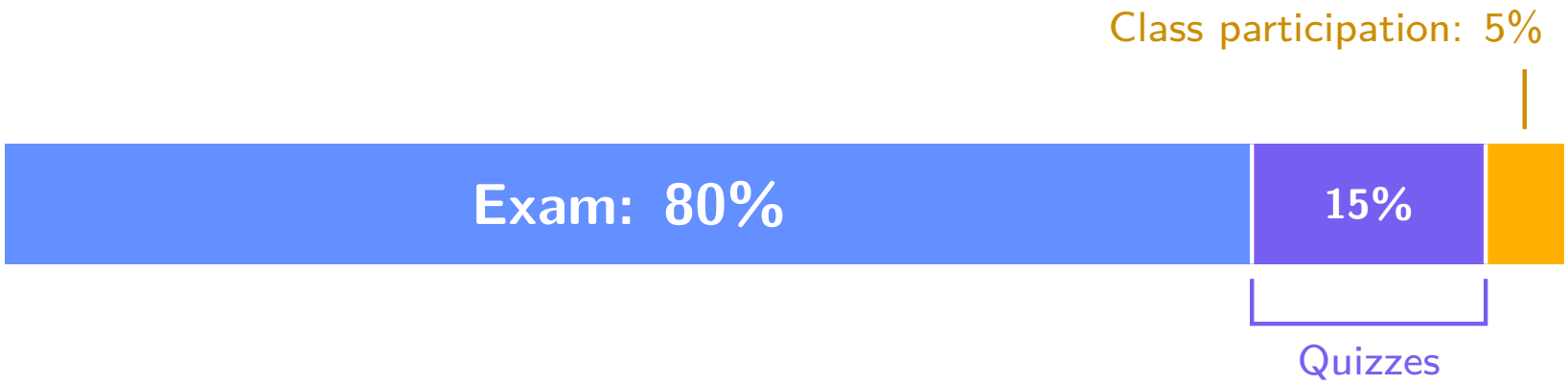
Ufora is used for communication:

- Announcements
- Course materials
- Exercises and hints

Don't miss anything

Set up Ufora notifications!

Examination and grading



- **Exam** (November/December): 80%. Resit exam in February.
- **Quizzes** (3 in total): 15%. Quiz dates are listed in the schedule.
- **Class participation** (9 out of 11): 5%

Classroom etiquette

- Arrive and be in your seats on time
- Don't leave before the end
- Try not to leave the class during the lecture
  - If you have to leave (e.g. medical emergency), do it discreetly
- Maintain a positive attitude during the lecture

Information for retaking students

How to prepare

If you have to retake the class, it is probably because of unfamiliarity with the techniques and the problems.

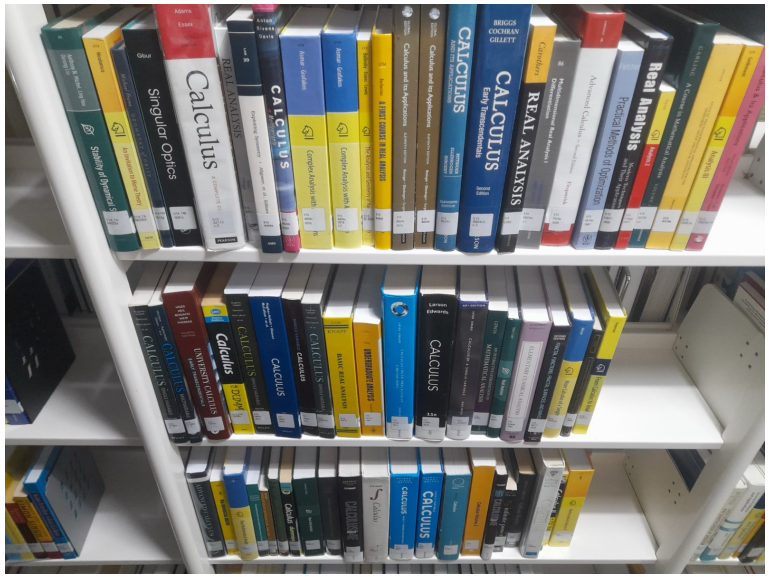
Be strategic

- Focus on what gave you trouble before
- Redo the problems, but act like you encounter them for the first time
- Do new problem sets
- Reach out for help in a timely manner

Use your time wisely.

Other sources of problem sets

- Adams and Essex: 7th edition and up
- Open Source Calculus
- Any other book with the word "Calculus" in the title!



Participation score carry-over

- You may choose to carry over your participation score from last semester.
- Use the form listed in the announcement on Ufora before **September 15**:
  Exemption: practical sessions (2026–27)
- Make sure to study up on the exercises that gave you a hard time!



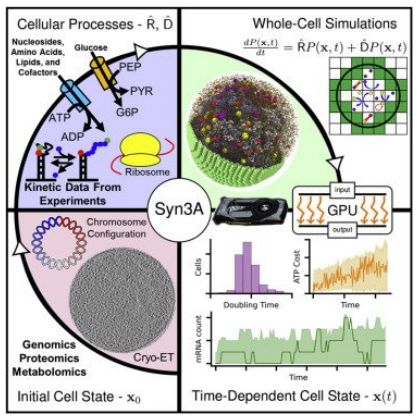
Note

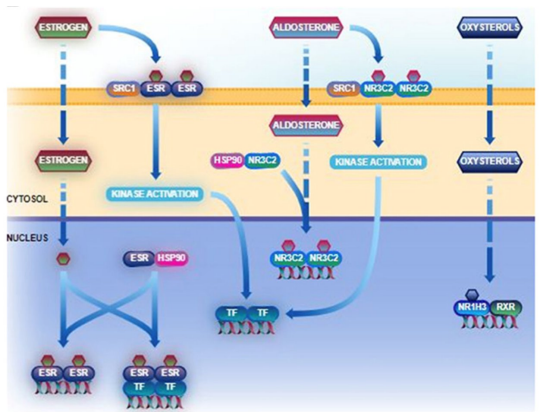
You must still take part in the quizzes!

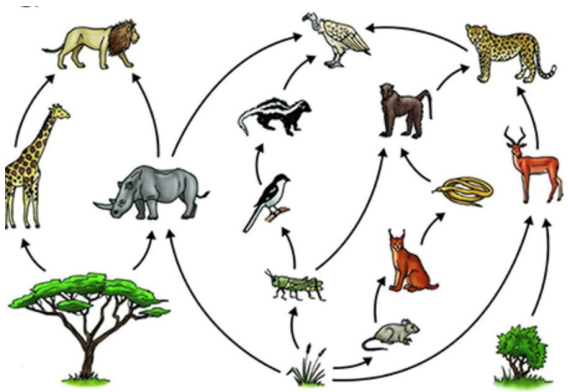
Why study math? How to study math?

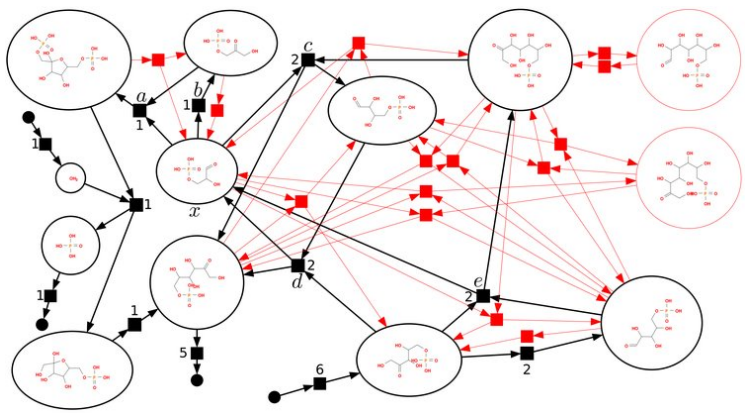
"The book of nature is written in the language of mathematics."

– Galileo Galilei

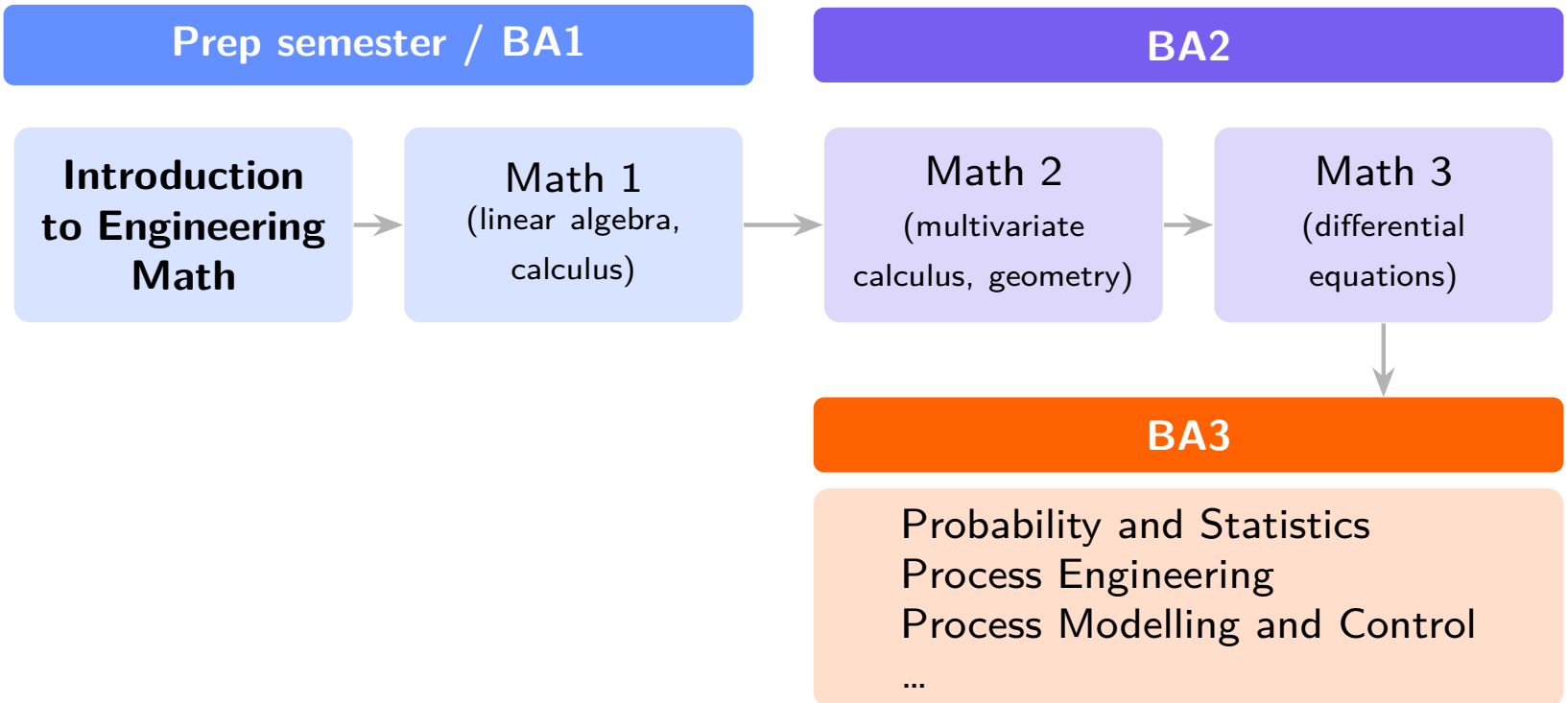








Math courses at GUGC



How to study math?

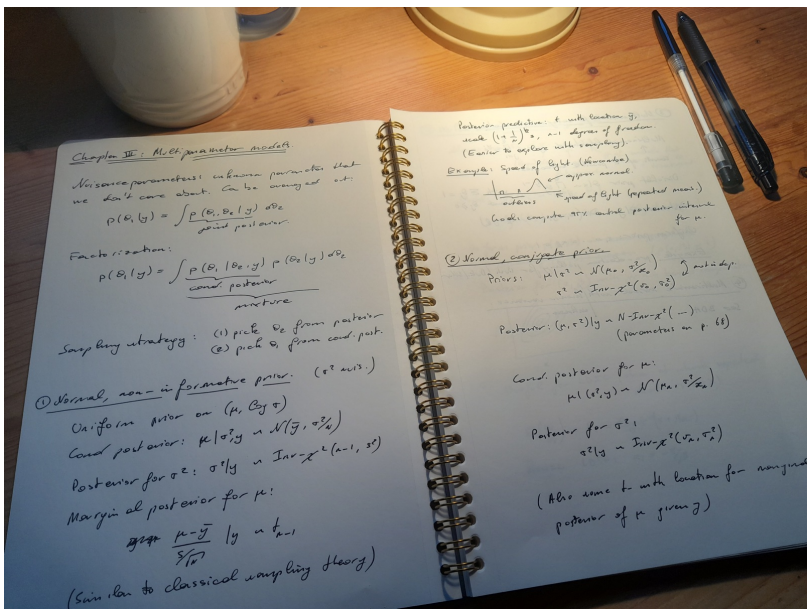
Three essential steps

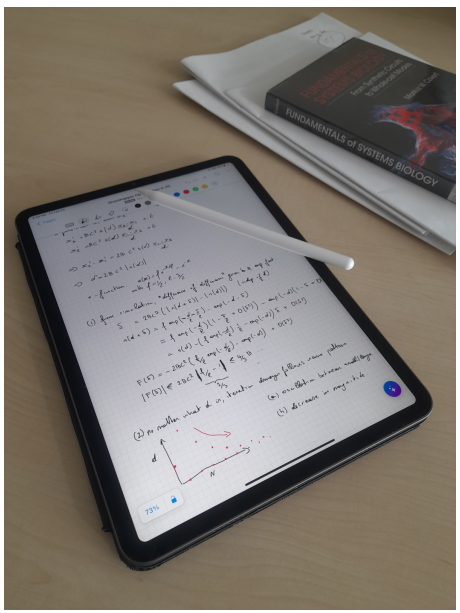
1. Take notes in class
2. Solve problems on your own
3. Critically evaluate your progress



Why write by hand?

- Writing by hand forces me and you to go slow.
- Paper notebook/tablet is OK
- **Don't take notes on a laptop**





Source: Why writing by hand is still the best way to retain information

What should you note down?

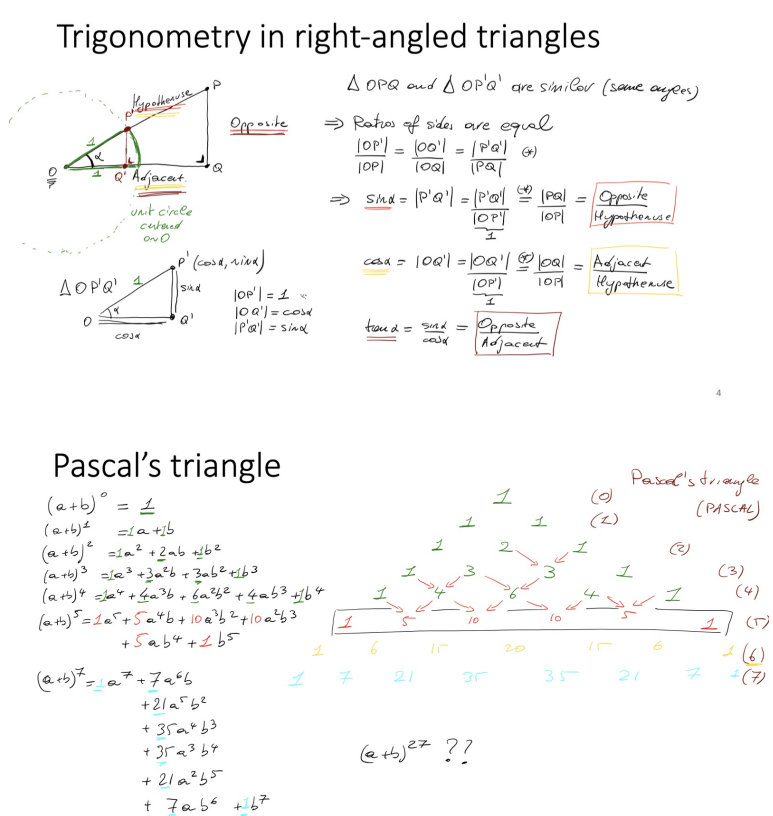
In theory class:

- Not everything is on the slides
- I will write on the tablet, you take notes
- You should be able to reconstruct proofs, solutions, ... from your notes

In practice class:

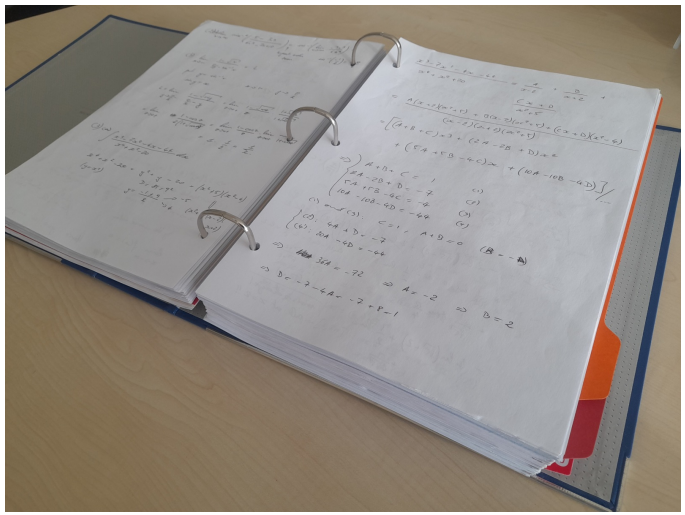
- Compare your solution with the model
- Correct wherever necessary (in a different color)

Example lecture slides



How to solve problems?

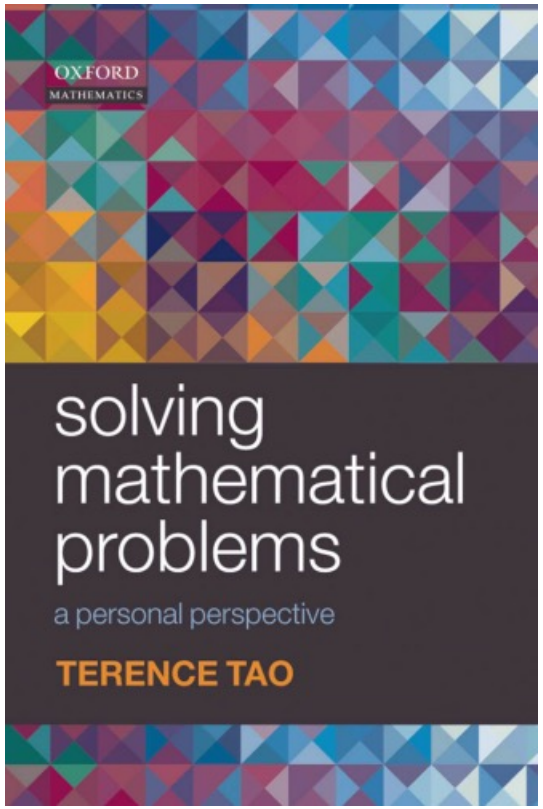
- Do the homework problems ahead of the practical session
- Don't be afraid to spend a lot of time, especially in the beginning
- Evaluate:
  - Was it easy?
  - Did I make many mistakes?
  - Do I feel confident?



Problems worthy of attack
prove their worth by fighting back.
– Piet Hein

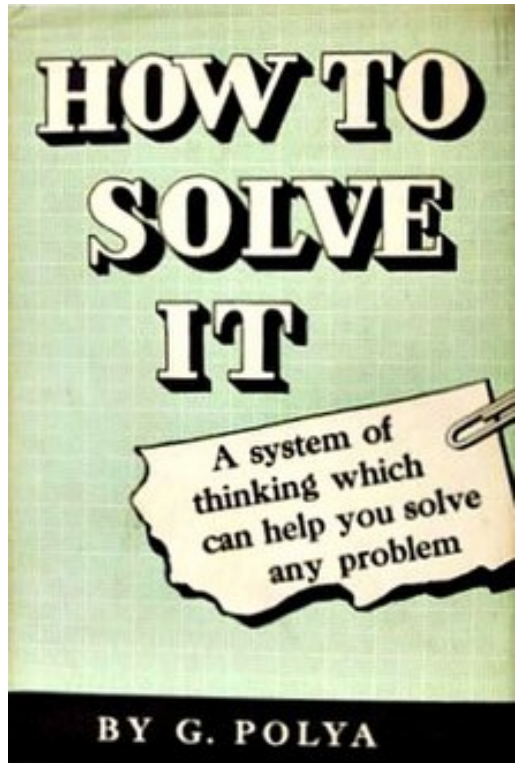
How to prepare for problem solving

- Put aside some regular time (e.g. 1 hour per day, before class)
- A little bit every day is better than a lot once per week
- Put away your phone, turn off the TV. It's just you and the problem.



Problem solving heuristics

- Have you seen it before? Or have you seen the same problem in a slightly different form?
- Do you know a related problem? Do you know a method that could be useful?
- Could you restate the problem? Could you restate it still differently? Go back to theory concepts.
- If you cannot solve the proposed problem, try to solve first some related problem. Could you imagine a more accessible related problem? Could you solve a part of the problem? Keep only a part of the condition, drop the other part; how far can you get?



Source: https://www.cs.yale.edu/homes/aspnes/pinewiki/ProblemSolvingTechniques.html

Feynman's problem solving algorithm

1. Write down the problem.
2. Think very hard.
3. Write down the solution.



How to make progress?

When it's too difficult

"The journey of a 1000 miles starts with a single step."

- Start with an easier problem.
- Review the model solutions from the theory lecture.
- Ask for help.

When it's too easy

Pick a harder problem! Don't waste your energy on simple problems!

What problem sets do we offer?

Homework problems

Designed to give you practice. Can you use the techniques?

Exam problems

Harder, designed to make you think.

Sample exams

Hard: exams from previous years.



You will find all these on Ufora.

How to ask for help?

Don't wait too long!

- After class: for small things that weren't clear
- During practical sessions: for help with specific problems
- Via email or in-office appointment: for bigger issues

For in-office meetings, make an appointment.

Show us that you've done the work!

- Useful to help us give you specific feedback
- Partial credit on the exam: the final answer is not enough!

How to ask for constructive feedback?

✗ Don'ts

- "I don't understand the course. Please explain ⟨huge topic from 3 months ago⟩."
- "Please send me the solution for problem X."

✓ Do's

- "I am stuck on problem X. I have tried A, B, and C, but I cannot continue because of Y."
- "Here is my solution for problem X. Can you tell me where I went wrong?"

How hard is the class?

- Passing rate for this class: **40%–45%**
- I want this number to be higher
- I will not decrease standards – this is GUGC
- I and the TAs are ready to help you with the class.

"...50% pass rate in the first year ..."

It is **NOT HARD** if you keep on top of things!