Signal Processing 2

(VU 389.170, 4.5 ECTS)

Winter Term 2020/21

Lecturer: Gerald Matz

Assistant: Thomas Dittrich

October 1, 2020

Quick Facts

- Time and place
  - Thursday 11:00–12:00, online or lecture hall EI 4
  - Friday 10:30–12:00, lecture hall EI 4
- Course language: English
- Course type: lectures and exercises (VU)
- Examination: written and oral exam
- Lecture notes: detailed lecture notes will be made available
- Course webpage:
  `https://tiss.tuwien.ac.at/course/educationDetails.xhtml?courseNr=389170`
  - detailed administrative information

About Us

Lecturer: Ao.Univ.Prof. DI Dr. Gerald Matz

Lectures, oral exams

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Assistant: Univ.Ass. DI Thomas Dittrich

Exercise classes, written exams

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Course Grading: Overview

- Grading based upon
  - exercise credits ($0 \leq z_1 \leq 49$)
  - written exam score ($0 \leq z_2 \leq 70$)
  - oral exam
- Minimum requirements
  - successfully solve at least 40 % of all exercise problems
  - present at least once in the exercise classes
  - score at least 35 points in the written exam
- If requirements are met, grade for written part is ($z = z_1 + z_2$)

$50 \leq z < 70$	$70 \leq z < 85$	$85 \leq z < 100$	$z \geq 100$
G4	B3	U2	S1

- Grade of written part serves as basis for oral exam

Course Grading: Exercises (1)

- Exercise classes are held in form of online meetings on Thursdays
  - we plan to have 10 exercise classes
  - course registration for the exercises via TISS is required
  - attendance at exercise classes is mandatory
- Up to 40 credits for solving problems
  - 10 problem sets, 4 problems each ($\Rightarrow$ 1 credit/problem)
  - in case of N problem sets: $10/N$ credits/problem
- Up to 9 bonus credits for presenting problems in class
  - up to 5 credits for the first time, 3 for 2^{nd} time, 1 for 3^{rd} time
- Problems to be solved individually, "oral cooperation" OK
  - copying solutions from others considered as serious offense

Course Grading: Exercises (2)

- Problem sets will be available on TUWEL one week before due
  - new problem sets will be announced via TUWEL
- Solutions have to be handed in via TUWEL
  - preferably LaTeX documents or similar
  - bad quality in scans can cost points — we can only grade what we can read
  - deadline: 9:00 (sharp) on Wednesday before the exercise class
  - late solutions will not be graded
- Grading for each problem is binary
  - credits for submissions can be seen on TUWEL
  - comments will be added to your submission
- Credits for at least 40 % of the problems have to be earned

Course Grading: Exercises (3)

- Voluntarily sign up for presentations via TUWEL
- Possible to sign up for multiple problems each week
- No need to sign up for all problems that were handed in
- If no volunteers for a problem: presenter will be chosen among the correct solutions — Students with less presentations will have higher priority in any cases
- At least one presentation throughout the semester necessary to pass the exercise part
- Exercise classes will be held using Zoom — presentations via screen sharing

Course Grading: Written and Oral Exam

- Registration via TISS is required (up to one week in advance)
- Four problems (70 credits) to be solved within three hours
- Lecture notes will be provided, use of a calculator is allowed
- No other documents or electronic devices are permitted
- At least 35 credits required for admission to oral exam
- The oral exam takes place by appointment

Course Schedule

- Preliminary schedule available online — No lecture on Oct. 2
- First exercise classes on Oct. 22 and Oct. 29
- Problem set #1 available from Oct. 13
  - will be announced via TISS
- First written exam on January 25, 2021

Recommendations

- Attend the lectures
- Exercise classes
  - discuss problems in small groups
  - start early (problems *may be* challenging)
- Written and oral exam
  - work on the sample exams (see course webpage)
  - prepare well (problems and questions *are* challenging)
- Do not hesitate to ask questions

Required Skills

- Probability theory
- Linear algebra
  - Eigendecomposition
  - Inverse of a matrix
  - ...
- Calculus
- Complex numbers
- Signals and systems theory
  - Convolution
  - Fourier analysis
  - z-transform
- (Proofs — direct, indirect, by mathematical induction)
- ...

Homework

- Subscribe to the course in TISS
- Register for course (exercise classes) in TISS until October 13, 2020
- Read up on administrative details
  - course webpage
  - TISS page

You Want More?

We have more! For example ...

- Graphical models (389.111, summer term)
- Signal detection (389.040, summer term)
- Parameter estimation methods (389.119, summer term)
- Convex optimization (389.122, summer term)
- MIMO communications (389.094, winter term)
- Wireless OFDM systems (389.133, winter term)
- Information theory (389.032, winter term)

Questions?