Hardware Fundamentals [CESE4005] (2024-2025)

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on Tuesday 13:45 and Thursday 8:45
at Drebbelweg - Instruction Room 4 (35.1.170)

September 2024

TU Delft

Summary of the Basic Information

- Course Code: **CESE4005**
- **Lecturers:** Georgi N. Gaydadjiev and Anteneh Gebregiorgis
- **Teaching Assistants:** (see Brightspace)
- **E-mails:** CESE4005.2024@tudelft.nl, g.n.gaydadjiev@tudelft.nl (please use "CESE4005HelpDesk:<*your text*>" as the beginning of the subject lines)

- **Exam:** Written examination on Friday, Nov 8, 9:00-12:00 @ Pulse-Hall 10 (33.A2.600)

- **Lecturing method:** (lectures and four hands-on labs, some lectures might be remote or skipped, *this will be announced*)
- **Office hours:** EWI 10.030 (30 min after the lectures) or Brightspace
- **Book:** N/A (see Webpage/BrightSpace for more information)

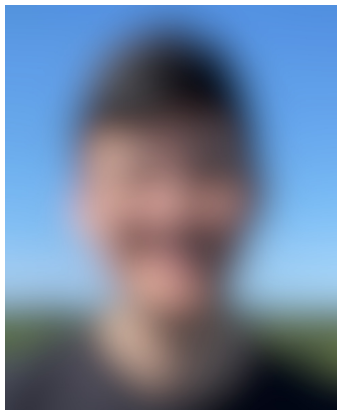
- **Additional reading:** see the recommended literature per topic

The CESE4005 (2023-24) team

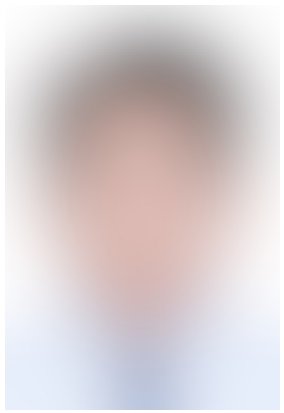
Georgi

Anteneh

TA1



TA2



TA3(?)

Course structure (2023-2024)

- **Sixteen** (16) **lectures**
  - Covering the three main topic of the course
  - Some additional information needed for the labs
- **Four** (4) **on site, PASS/FAIL labs**
  - Every second Thursday 13:45-17:45 at AS-Classroom 12 (22.F.104) (#1) and then in Pulse-Hall 10 (33.A2.600)
  - TAs will guide you through the labs
  - Prepare (homeworks are essential for a PASS)
- Slides on BrightSpace may be changed right after a lecture
  - New relevant material will be added when needed

Grading Scheme

- Final exam and/or Resit, and bonuses from the practical assignments (4 x 0.25 max)

- Final grade **F=min(E+B, 10)** with
  - **E** = your Exam or Resit grade
  - **B** = your Bonus from labs **(0.25*(BL1..BL4))**
  - Passing? (6.0 is still the required minimum)
    - **iff** (**E >= 5.25**) **and (all** four **Labs == PASS)**
    - otherwise (E<5 **or** one or more Lab == FAIL) **F=min(E, 5)**
  - Rounding **F** to the .5 up (e.g., 7.76 ➔ 8.0)
    - except for the range **[5.25, 6.0) ➔ 6.0**

Lab Assignments

- The Goal: to gain understanding of the transistors, the basic building block of digital computing technology. Moreover, the basic theories behind Digital Signals, Systems and Control will be put at work.
- Four (4) practical lab assignments
  - Content and information on the web pages
- You will work **in groups of two**
- **Support:**
  - joining the lab sessions is a must to grant a PASS
  - asking questions is highly encouraged
  - you can always send e-mail with subject line “Helpdesk:….”
  - please note, that after sending your question some time might be needed to provide a good answer

Corner cases

- Lab grades from the last year **can't be** used
  - **Repeating students** should perform all labs as everybody else
  - Please contact me if you have questions about this
- Lab assignment results are valid for the same year's Resit
- **It is important** to let us know way ahead of time if you will not be able to attend one of the four lab sessions along with a valid reason

Topics (very high-level overview)

- Transistors
- From Transistors to Gates and useful Digital Logic Structures
- "Programming" the Hardware in Verilog
- Introduction to Digital and Continuous Signals
- Discrete Systems, including main Models and Transformations
- The fundamentals of Digital Control Systems

The 2024 Schedule

Date	Time	Location(s)
week 36		
Tue 3 Sep	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 5 Sep	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
week 37		
Tue 10 Sep	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 12 Sep	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
LAB1	13:45 - 17:45	AS-Classroom 12 (22.F.104)
week 38		
Tue 17 Sep	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 19 Sep	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
week 39		
Tue 24 Sep	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 26 Sep	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
LAB2	13:45 - 17:45	Pulse-Hall 10 (33.A2.600)
week 40		
Tue 1 Oct	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)

Date	Time	Location(s)
week 40		
Thu 3 Oct	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
week 41		
Tue 8 Oct	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 10 Oct	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
LAB3	13:45 - 17:45	Pulse-Hall 10 (33.A2.600)
week 42		
Tue 15 Oct	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 17 Oct	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
week 43		
Tue 22 Oct	13:45 - 15:45	Drebbelweg-Instruction Room 4 (35.1.170)
Thu 24 Oct	08:45 - 10:45	Drebbelweg-Instruction Room 4 (35.1.170)
LAB4	13:45 - 17:45	Pulse-Hall 10 (33.A2.600)

On Zoom or no lecture (TBD)

Some Additional Information

✓ The course official website is:
https://cese.pages.ewi.tudelft.nl/hardware-fundamentals/

(not up to date as of Sept 3!)

✓ Additional information will be made available as we progress during the quarter (check the webpages)

✓ If you are really interested in learning, please ask questions!

✓ Hugely ambitious plans in respect of the material to cover

✓ Let us explore the main CESE related hardware concepts…