Signals, Instruments, and Systems - Final Exam Guidelines

Here are the guidelines for the final exam of the course Signals, Instruments, and Systems (SIS). Please read them carefully and make sure all points are clear.

Logistics and organization:

1. The exam will take place on **Monday January 29**, from **15h15 to 18h15**, in room **CM 1 121.**
2. You must bring your student ID in order to take the exam.
3. We will give you an assignment booklet and a separate answer booklet.
4. You must write your SCIPER number in front of the assignment booklet and **on every sheet** of the answer booklet.
5. All answers must be written on the provided answer sheet, do not use the assignment sheets (answers on the assignment sheets will not be taken into account). The answer sheets will provide enough space for your solution; in case you will need additional blank sheets, we can provide them to you during the exam. Do not forget to add your SCIPER number on each additional blank sheet you may use.
6. You should not write your name anywhere.
7. You will have to return both the assignment and the answer booklets at the end of the exam.

The exam:

1. The general breakdown of the exam will be 4 equal parts:
   (a) *Signal processing* (digital vs. analog; discrete vs. continuous time signals; time and frequency domains; Fourier, Laplace, and Z-transforms; Bode diagrams; analog and digital filters; sampling, aliasing, signal reconstruction; transfer function; frequency, impulse, and step response).
   (b) *Embedded systems* (communication channel dimensioning and properties; power consumption and generation; sensors properties; memory management; embedded system programming, interrupts).
   (c*) Robot control and localization* (perception-to-action loop, sensors and actuators, control architectures, odometry, Kalman filtering, error sources)
   (d) *Comprehensive exercise/case study* (case study/combination of all topics)
2. Each part is worth 30 points. The maximum score you can get is 120 points; you will be awarded the maximum grade if you obtain 100 or more points; your potential bonus of points above 100 will be integrated into the overall weighted sum for the course grade.
3. The assignment will be available in English only and must be answered in English. Note that we do not grade on grammar as long as the meaning is clear.
4. You will need a calculator, but it has to be non-programmable and non-graphing. If you have any doubts about whether your calculator is allowed, please write us an e-mail mentioning the exact model number.
5. The exam is open book, i.e. all printed/written material is allowed (e.g., books, lecture notes, exercises, solutions, personal notes). Electronic devices are NOT allowed, except for a simple calculator, as explained above.

6. Sample questions for this pen-and-paper exam are represented by the **"Q" type questions** used in lab verification tests of current and previous course editions (AY 2018-2019, AY 2022-2023, AY 2023-2024) as well as homework assignments (AY 2021-2022) and are all available on-line on the teaching pages of the DISAL website. As in the previous years, we will not distribute previous exam assignments as this will allow us to maintain the exam difficulty reasonable and fair over the years for all the students having attended this course.

If you have further questions or concerns, please send us an email at sis-ta@groupes.epfl.ch.