

# ECE 486 Fall 2023, ZJUI: Term Test I

The following information is a guideline in preparing for the midterm quiz.

**Time and place.** The term test will be held on Tues, Oct 26, in class (13:15–14:15). Please be seated 5 minutes prior to the starting time. Students who are late will not be given extra time.

**Topics covered.** The exam will cover everything up to and including the Oct 19 class (Wk5). Here is a list of specific topics:

- Models of simple mechanical and electrical systems; State-space equations; Linearization
- Impulse response and convolution integral; Transfer function, frequency response; Computing transfer functions using Laplace transform, partial fractions method,
- All-integrator diagrams; Transfer functions for basic block diagrams (series, parallel, and feedback connections) and block diagram reduction
- Prototype 2nd order response, effect of complex poles; Time-domain specifications (rising time, settling time, overshoot) and their interpretation in the s-plane; Effect of zeros; Stability and Routh-Hurwitz criterion
- Open loop vs. feedback control: reference tracking and disturbance rejection, sensitivity to parameter variations, time response; Basics of PID control

**What to bring.** The exam is closed-book, closed-notes. You may bring in one handwritten (double-sided) A4-sheet with any necessary formulas. A calculator will not be necessary, but you can bring a simple, non-graphic calculator. Other electronic devices are not allowed.

**What to expect.** Complete all questions in the given time. Show your approach clearly as you are not merely graded based on final answers but also the steps you took. You are not allowed to communicate with anyone during the test except with the invigilators. Do not start writing unless instructed by the invigilator and stop writing when told to do so.

**Tips for preparing.** The primary goal of the test is to check your understanding of the main concepts, not memorization or computational skills. Make sure to follow up on all lecture material, readings, and homework problems and solutions. Come for consultation hours if you need help. Lastly, do not be too worried about the results. Treat this as a chance to gauge your level of understanding before moving on to more advanced concepts and eventually in preparing your final exam. 😊