



## MEEG 312 Vibration and Control Lab

Fall 2020, 1 credit

Prof. Adam M. Wickenheiser  
Department of Mechanical Engineering  
110 Spencer Lab  
[amwick@udel.edu](mailto:amwick@udel.edu)  
302-831-8143

### COREQUISITE

MEEG 311 Control Systems

You should also be familiar with basic Python programming, including [numpy](#) and [matplotlib](#)

### COURSE LEARNING OBJECTIVES

To be able to identify and control the response of linear systems using position feedback. By the end of the course, the student will be able to:

1. Identify the parameters that govern the behavior of linear systems by analyzing time- and frequency-domain response data
2. Tune the closed-loop response of electromechanical systems using classical control techniques
3. Design interactive Python notebooks to present design and analysis results

### LAB MEETING TIMES

Mondays	1:25pm-3:15pm 3:30pm-5:20pm
Wednesdays	1:25pm-3:15pm 3:30pm-5:20pm
Fridays	12:20pm-2:10pm

All labs take place in Spencer Lab 123.

### COURSE FORMAT

This lab course is offered in both in-person and online formats. There is no difference in the grading or the amount of work between the online and in-person formats of the course. In one case you will generate data using simulations, and in the other case you will use the hardware in the lab. All pre- and post-lab work is identical between the formats.

## LAB GROUPS

Each lab section is divided into Groups A and B. Please check the document Group Assignments.pdf on Canvas for your assignment.

If you have elected for the online format, your group assignment is the following:

- Last Name A-M: Group A
- Last Name N-Z: Group B

These groups' activities and due dates alternate weeks according to the following schedule:

Week	Date	Group A		Group B	
		In-person Lab	What's Due	In-person Lab	What's Due
1	8/31				
2	9/7		Quiz 1, Pre-lab 1		
3	9/14	Lab 1			Quiz 1, Pre-lab 1
4	9/21		Quiz 2, Pre-lab 2	Lab 1	
5	9/28	Lab 2	Post-lab 1		Quiz 2, Pre-lab 2
6	10/5		Quiz 3, Pre-lab 3	Lab 2	Post-lab 1
7	10/12	Lab 3	Post-lab 2		Quiz 3, Pre-lab 3
8	10/19		Quiz 4, Pre-lab 4	Lab 3	Post-lab 2
9	10/26	Lab 4	Post-lab 3		Quiz 4, Pre-lab 4
10	11/2		Quiz 5, Pre-lab 5	Lab 4	Post-lab 3
11	11/9	Lab 5	Post-lab 4		Quiz 5, Pre-lab 5
12	11/16			Lab 5	Post-lab 4
13	11/23	Thanksgiving Break			
14	11/30		Post-lab 5		
15	12/7				Post-lab 5

**All due dates are at 11:59 pm the day of the week of your lab section.**

Your group assignments also include a Wave number.

- If you are in Wave 1, please report to lab at the start of your lab session
- If you are in Wave 2, please report to lab one hour after the start of your lab session

Each wave will have 50 minutes to complete their lab work, leaving a 10 minute gap between waves for clean-up and transition.

## GRADING

This course consists of 5 labs. Each lab is weighted equally, and so each lab counts for 20% of the overall grade.

Each lab grade can be further broken down into the following components:

- Pre-lab quiz (10%)

Each lab experience begins with an introductory/background video posted on Canvas. Accompanying this video is a Canvas quiz, which must be completed before proceeding. These quizzes will be graded on a completion basis: as long as you make an honest attempt to answer each question, you will receive full credit. The quiz covers the most important material from the video.

- Pre-lab questions (20%)

The manual for each lab (a Python notebook) will be posted at least 2 weeks prior to the start of each lab (group A's meeting time). This manual will feature one or more pre-lab programming questions that must be answered and submitted one week before coming to lab. No late submissions will be accepted. The grader will give you feedback at least 4 days before your lab meeting so that you have time to revise your answers. These do not need to be resubmitted, but getting them correct will help with the post-lab assignment.

- In-lab participation (required)

Every student must attend each of the labs in person or must generate their own data using the simulation code provided (online option). Attendance will not be worth any points; however, failure to participate in any lab will result in a course grade of F.

- Post-lab report (70%)

Reports (completed Python notebooks) are due two weeks after the lab session.

All submissions are done through Canvas.

Re-grade requests must be submitted via email or during office hours within one week following the return of the graded material. A justification must accompany any re-grade request. It is possible for a grade to be lowered after a re-grade. Please check your grades on Canvas every week to take advantage of this policy.

Grades are not curved in this course. It is theoretically possible for everyone in the class to get an A (or an F). Your grade depends only on your own performance, not on how well everyone else does. Grades may also be adjusted due to outstanding attitude and effort. No extra credit or make-ups will be given on an individual basis.

## GRADE SCALE

Grade	Interval		Grade	Interval
<b>A</b>	≥ 93%		<b>C</b>	73% to 77%
<b>A-</b>	90% to 93%		<b>C-</b>	70% to 73%
<b>B+</b>	87% to 90%		<b>D+</b>	67% to 70%
<b>B</b>	83% to 87%		<b>D</b>	63% to 67%
<b>B-</b>	80% to 83%		<b>D-</b>	60% to 63%
<b>C+</b>	77% to 80%		<b>F</b>	≤ 60%

## ATTENDANCE

Students are expected to attend every lab section to which they are assigned (group A or B). Students must avoid attending lab if they are ill. Please inform the instructor as soon as possible if you must miss lab due to illness to reschedule. Other reasons for absence must be communicated to the instructor ahead of time and approved. If at any point you wish to switch between the online and in-person formats, please contact the instructor as soon as possible to confirm the switch.

Materials you will need for each lab will be posted on Canvas, and all administrative announcements will also be posted there.

## ACADEMIC INTEGRITY

Students can work collaboratively on pre- and post-lab questions in order to learn together but submissions should reflect an individual effort. Strict copying is not permitted. Sharing your answers (either in part or in whole) with another student will result in a 0 for both students for a first offense. Repeat offenders will be reported to the Office of Student Conduct.

Please familiarize yourself with UD policies regarding academic dishonesty. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an assignment, to re-submit the same assignment for different classes, or to allow or assist another to commit these acts corrupts the educational process. Students are expected to do their own work and neither give nor receive unauthorized assistance. Complete details of the university's academic integrity policies and procedures can be found at <http://www1.udel.edu/studentconduct/policyref.html> Office of Student Conduct, 218 Hullahen Hall, (302) 831-2117. E-mail: [student-conduct@udel.edu](mailto:student-conduct@udel.edu)

## HARASSMENT AND DISCRIMINATION

The University of Delaware works to promote an academic and work environment that is free from all forms of discrimination, including harassment. As a member of the community, your rights, resource and responsibilities are reflected in the non-discrimination and sexual misconduct policies. Please familiarize yourself with these policies at [www.udel.edu/oei](http://www.udel.edu/oei). You can report any concerns to the University's Office of Equity & Inclusion, at 305 Hullahen Hall, (302) 831-8063 or you can report anonymously through UD Police (302) 831-2222 or the EthicsPoint Compliance Hotline at [www1.udel.edu/compliance](http://www1.udel.edu/compliance). You can also report any violation of UD policy on harassment, discrimination, or abuse of any person at this site: [sites.udel.edu/sexualmisconduct/how-to-report/](http://sites.udel.edu/sexualmisconduct/how-to-report/)

## FACULTY STATEMENT ON DISCLOSURES OF INSTANCES OF SEXUAL MISCONDUCT

If, at any time during this course, I happen to be made aware that a student may have been the victim of sexual misconduct (including sexual harassment, sexual violence, domestic/dating violence, or stalking), I am obligated to inform the university's Title IX Coordinator. The university needs to know information about such incidents in order to offer resources to victims and to ensure a safe campus environment for everyone. The Title IX Coordinator will decide if the incident should be examined further. If such a situation is disclosed to me in class, in a paper assignment, or in office hours, I promise to protect your privacy--I will not disclose the incident to anyone but the Title IX Coordinator. For more information on Sexual Misconduct policies, where to get help, and how to reporting information, please refer to [www.udel.edu/sexualmisconduct](http://www.udel.edu/sexualmisconduct). At UD, we provide 24-hour crisis assistance and victim advocacy and counseling. Contact 302-831-1001, UD Helpline 24/7/365, to get in touch with a sexual offense support advocate.

For information on various places you can turn for help, more information on Sexual Misconduct policies, where to get help, and reporting information please refer to [www.udel.edu/sexualmisconduct](http://www.udel.edu/sexualmisconduct)

## INCLUSION OF DIVERSE LEARNING NEEDS

Any student who thinks he/she may need an accommodation based on a disability should contact the Office of Disability Support Services (DSS) office as soon as possible. The DSS office is located at 240 Academy Street, Alison Hall Suite 130, Phone: 302-831-4643, fax: 302-831-3261, DSS website ([www.udel.edu/DSS/](http://www.udel.edu/DSS/)). You may contact DSS at [dsoffice@udel.edu](mailto:dsoffice@udel.edu)

## NON-DISCRIMINATION

The University of Delaware does not discriminate against any person on the basis of race, color, national origin, sex, gender identity or expression, sexual orientation, genetic information, marital status, disability, religion, age, veteran status or any other characteristic protected by applicable law in its employment, educational programs and activities, admissions policies, and scholarship and loan programs as required by Title IX of the Educational Amendments of 1972, the Americans with Disabilities Act of 1990, Section 504 of the Rehabilitation Act of 1973, Title VII of the Civil Rights Act of 1964, and other applicable statutes and University policies. The University of Delaware also prohibits unlawful harassment including sexual harassment and sexual violence.

For inquiries or complaints related to non-discrimination policies, please contact:  
Director, Institutional Equity & Title IX Coordinator- Susan L. Groff, Ed.D. [groff@udel.edu](mailto:groff@udel.edu), 305 Hullihen Hall Newark, DE 19716 (302) 831-8063

For complaints related to Section 504 of the Rehabilitation Act of 1973 and/or the Americans with Disabilities Act, please contact: Director, Office of Disability Support Services, Anne L. Jannarone, M.Ed., Ed.S. - [ajannaro@udel.edu](mailto:ajannaro@udel.edu)  
Alison Hall, Suite 130, Newark, DE 19716 (302) 831-4643 OR contact the U.S. Department of Education - Office for Civil Rights ([wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm](http://wdcrobcolp01.ed.gov/CFAPPS/OCR/contactus.cfm))

## CENTER FOR COUNSELING AND STUDENT DEVELOPMENT (CCSD)

At times, personal problems, stress, or life circumstances can interfere with your academic functioning. UD's Center for Counseling and Student Development provides a variety of services to support you in your academic work and be successful. The Center works with you on a confidential and individual basis; in addition, you may utilize assessment and counseling services, and referral to additional resources off campus. CCSD is funded by the student health fee and does not charge for services. For more information, visit <http://sites.udel.edu/counseling/>, or call the office at 831-2141.