Process Control Theory
ECH 4323 Section 24SS (Class Number 23424)
Class Periods: W Period 10 (5:10-6:00 PM) and F Periods 9-10 (4:05 – 6:00 PM)
Location: Larsen 310
Academic Term: Fall 2025

Instructor: Spyros A. Svoronos
Phone: 352-392-9101 (O), 352-378-1342 (H landline), I do not carry a cell phone
E-mail: svoronos@ufl.edu
Office Hours: M 6:15-7:30 PM in my office (Black Hall, 312) and via Zoom
T 2:00-3:30 PM in my office
W 6:15-7:30 PM in my office
R 2:00-3:30 PM in my office and via Zoom
F 6:15-7:15 PM in my office and via Zoom

Zoom: https://ufl.zoom.us/j/6379945549 with passcode: 0

Mask policy: I am considered high risk, as I am older than 70 and have certain health issues. To protect myself I will be wearing a mask consistently. I believe that this precautionary measure is ample to safeguard my health. **It's important for me to clarify that my decision to wear a mask should not be misconstrued as a solicitation for you to do the same.** My choice to wear a mask should not influence your own decision regarding mask usage.

Teaching Assistant: None

Course Description
The analysis and automatic control of process systems in chemical engineering. (3 credits)

Course Pre-Requisites / Co-Requisites
Prerequisites: COT 3502
Corequisite: ECH 4323L*
*As ECH 4323 is a co-requisite of ECH4323L, ECH 4323 and ECH 4323L must be taken together.

Course Objectives
1. The student will be able to formulate dynamic models for chemical engineering systems and to perform model-linearization procedures
2. The student will be able to obtain approximate process models from experimental data
3. The student will be able to use and tune proportional-integral-derivative controllers
4. The student will be able to analyze the performance and stability of linear control systems, both open loop and closed loop

Materials and Supply Fees: None

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	High
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbook

None. Instructor notes are posted in CANVAS.

Required Software

Frequency response software that handles deadtime is provided. The software was authored by Astha A Svoronos.

Required Computer

A laptop computer **running Windows** and Excel is required. An M series Mac with an emulator must emulate code and a USB port, and this may not be possible.

Spring 2021 Videos:

https://uflorida-my.sharepoint.com/my?id=%2Fpersonal%2Fsvoronos%5Fufl%5Fedu%2FDocuments%2F%5F%5Fsp21&ga=1

Course Schedule (timing is approximate):

- Introduction to feedback and feedforward control (1st week)
- Nonlinear state space models and their linearization (weeks 2-4)
- Laplace transforms, transfer functions, and open-loop stability (weeks 5-6)
- First-order plus time delay systems and approximate transfer functions from experimental data (weeks 7-8)
- The PID control law and low-pass filtering (week 8)
- Controller tuning methods for first order plus time delay systems (weeks 8-9)
- Velocity and position forms of the discrete PID control law (week 9)
- Frequency response analysis (weeks 10-11)
- Closed-loop stability analysis (weeks 12-13)
- Controller tuning methods for any transfer function model (week 14)
- Optional topics, depending on time availability: Cascade control, design of feedforward control, controller design for open-loop unstable systems (week 15)

Important Dates

*Wednesday, October 8, Midterm Review (Starts at 6:30 pm, could last 2-3 hours)**
Friday, October 10, Midterm Exam (4:00 – 6:00 pm in room Larsen 310, could last longer)
*Thursday, December 4, Final Review (Starts at 2:30 pm, could last 3-5 hours)**
Wednesday, December 10, Final Exam (12:30 -2:30 pm in room Larsen 310, could last longer)
** Room to be determined*

Attendance Policy, Class Expectations, and Make-Up Policy

Class attendance is required and will be monitored by the instructor Fridays between periods 9 and 10. Frequent unexcused absences will significantly affect your class attendance and participation grade, which accounts for 5% of your total grade (see below).

Requirements for class attendance, make-up exams, assignments, and other work in this course are consistent with university policies (see https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/). I will work with students who have University-excused absences to promote health and safety, and I will provide reasonable accommodations for exams and extensions for assignments. **With documentation, absences for job interviews or graduate schools will be considered excused.**

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Midterm Exam	100	37.5%
Final Exam	100	37.5%
Homework*	Normalized to 100	20%
Class Attendance and Participation**	100	5%

*Each homework problem is graded on a scale of 0-3. Each problem that is messy and difficult to read may lose a point after one warning has been issued.
**Students will receive an 88 if they attend all classes (aside from university excused absences) but do not contribute to class discussions or ask questions. Then the grade is reduced according to the frequency of unexcused class absences and raised according to how active a participant they are.

Grading Policy
The grading scale for the course will be as follows:

87-100	A	4.00
83-86.9	A-	3.67
80-82.9	B+	3.33
70-79.9	B	3.00
65-69.9	B-	2.67
60-64.9	C+	2.33
45-59.9	C	2.00
35-44.9	C-	1.67
25-34.9	D+	1.33
20-24.9	D	1.00
15-19.9	D-	0.67
0-14.9	E	0.00

The instructor may lower the threshold for attaining the letter grades specified above (to the benefit of the students).

More information on UF grading policy may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

ADDITIONAL INFORMATION

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online. Students can complete evaluations in three ways:

1. The email they receive from GatorEvals,
2. Their Canvas course menu under GatorEvals, or
3. The central portal at https://my-ufl.bluera.com

Guidance on how to provide constructive feedback is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to

social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.ufl.edu.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus: https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process.