



COURSE OBJECTIVES AND SCOPE: To develop familiarity with feedback control and its implementation in practical applications. Topics include principles of feedback control, linear systems, the Laplace transform and its application, controllers, transient response analysis, error analysis, control system design and simulation, and other selected topics. Prerequisites: MATH 425 (Calculus I).

CLASS MEETING INFO:

Section	Day	Start Time	End Time	Room
Lecture (M1)	Monday & Wednesday	1:10PM	2:30PM	Pandora 102
Lab (LM1)	Monday	2:40PM	4:00PM	Pandora 146

INSTRUCTOR:

T. Sean Tavares, PhD

Associate Professor, Mechanical Engineering Technology

Pandora Rm. 103

Office Phone: (603) 641-4322

E-mail: Sean.Tavares@unh.edu (Preferred contact method. Will usually respond within 24 hours.)

OFFICE HOURS: Wednesday & Thursday, 2:40pm-3:40pm, and by appointment. Students are encouraged to seek help before falling too far behind.

REQUIRED TEXT: There is one required book for this course:

Schaum's Outline of Feedback and Control Systems, 2nd (print) or 3rd (electronic) Edition, J. DiStefano, A. Stubberud, and I. Williams: ISBN: 978-0071829489

BOOKS ON LIBRARY RESERVE: A copy of the textbook has been put on reserve in the library. Copies of the following three supplemental references are also on reserve in the library:

1. *Differential Equations for Dummies*, Wiley, Steven Holzner: ISBN: 9780470178140
2. *Differential Equations Workbook for Dummies*, Wiley, Steven Holzner: ISBN: 9780470472019
3. *Modern Control Systems*, Richard C. Dorf and Robert H. Bishop.

COURSE CREDITS & FORMAT: This is a 4.0 credit course. Classes consist of lectures and labs. The labs involve both application of concepts taught in lecture and some new material related to techniques for designing and analyzing control systems and their components. The modality will be in-person unless unforeseen circumstances require a change to a remote or hybrid format.

COURSE MANAGEMENT: The course is administered using the myCourses (Canvas) learning management system. <https://mycourses.unh.edu>



COURSE GRADE: The course grade will be determined using the following weighting of assignments:

Homework	30%	Tests (2 planned)	30%
Lab Projects	20%	Final Exam	15%
Practice Problems	5%		

CALCULATION OF LETTER GRADES: Letter grades for the course correspond to the following percentage points in the Canvas gradebook:

Letter Grade	Range
A	100% to 94%
A-	< 94% to 90%
B+	< 90% to 87%
B	< 87% to 84%
B-	< 84% to 80%
C+	< 80% to 77%
C	< 77% to 74%
C-	< 74% to 70%
D+	< 70% to 67%
D	< 67% to 64%
D-	< 64% to 61%
F	< 61% to 0%

ASSIGNMENTS AND COURSE SPECIFIC POLICIES: The following is a brief description of the graded assignments for the course along with some course specific policies:

Lectures: Students are responsible for all material covered in class and in reading assignments. Regular attendance at lectures and participation in discussions is strongly encouraged.

Homework: Homework assignments make up a substantial component of the course grade. Submissions will be files uploaded to myCourses (unless instructed otherwise). There will be an assignment Due Date followed by a short Grace Period. Assignments received after the Due Date but before the end of the Grace Period will be subject to a 10% penalty. No credit will be given for an assignment after the end of the Grace Period.

Lab Projects: The lab assignments will largely involve a computer simulation using MATLAB Simulink software. Some measurements on physical systems may be made. Closed Toe Shoes and use of appropriate Personal Protective Equipment (safety glasses, etc.) are required for labs involving physical systems. It is the student's responsibility to make up any missed lab work.



Practice Problems: These are short problems and conceptual questions designed to reinforce course material in a timely manner. Practice problems will be assigned, completed, and discussed during class time with rare exceptions. You can think of the practice problem component of the grade as points for class attendance and participation.

Tests & Final Exam: Tests will typically be given during scheduled lecture time and/or lab periods. (Part or all of one or more tests may be given in take-home format.) If a student needs to miss a test for any reason, the instructor must be notified prior to the session in which it is given. If an exam is missed without prior notification the student will receive a grade of zero. In extreme circumstances and if no prior notification is possible, the student must contact the instructor within 24 hours of the missed test or exam and explain in writing why the scheduled test was missed. See the section on Student Accessibility Services if you have circumstances that may require modified testing.

REQUIREMENTS FOR ASSIGNMENTS: For homework assignments, lab reports, practice problems/quizzes, tests, and final exam:

- (1) Show your steps in solving a problem clearly. (No partial credit can be given unless your work can be followed.)
- (2) Clearly identify your final answers.
- (3) Define variables clearly and use sketches or graphs where appropriate.
- (4) Submit your work in the format requested for a particular assignment. Your submission should present the problems in the order assigned on the assignment sheet.
- (5) Submit assignments as a single coherent file unless requested to do otherwise.
- (6) You are responsible for the content and legibility of all submitted assignments. Check to make sure the file you have uploaded corresponds to the given assignment and is easily readable. Illegible content will not be considered for grading.
- (7) Tests and Final Exam are required to be an individual effort. No collaboration!
- (8) Collaboration on Homework, Labs, and Practice Problems is permitted.

ET MINIMUM GRADE REQUIREMENT: Starting with students who entered the ET program in the fall of 2022, the following minimum grade requirement applies:

- Each course required in the major must be completed with a minimum grade of C-. Students must attain a minimum GPA in the major of 2.0.
- Starting with the 2023-2024 Catalog, prerequisites for a major course must be completed with a grade of C- or better before a major course can be taken. (Other prerequisite rules may apply. See Course Catalog for specifics.)

For more information about Academic Requirements see: <https://catalog.unh.edu/undergraduate/>



RELEVANCE TO ET PROGRAM ACCREDITATION: The UNH Engineering Technology Program is accredited by the Accreditation Board for Engineering and Technology (ABET). Learning objectives for ET courses are aligned with the ABET Outcomes for baccalaureate degree programs in Engineering Technology. Course ET 674 is designed to address the following specific EET and MET Program Criteria for Baccalaureate Level Programs described in the section entitled *II. Program Criteria*.

For EET Students:

- c) The ability to analyze, design and implement one or more of the following: control systems, instrumentation systems, communications systems, computer systems, or power systems.
- e) The ability to utilize differential and integral calculus, as a minimum, to characterize the performance of electrical/electronic systems.

For MET Students:

- d) Elements of differential and integral calculus.
- j) Electrical circuits (ac and dc) and electronic controls.



Course Outline for Fall 2025

Semester Week	Date - Day	Tentative Agenda
Week 1	Aug 25 – M	Lecture – Course Overview & Intro to Control, Notes 1 NO LAB MEETING
	Aug 27 – W	Lecture – Intro to Control, Notes 1
Week 2	Sept 1 – M	NO CLASSES - Labor Day Holiday
	Sept 3 – W	Lecture – Finish Notes 1; Start 1 st Order Systems, Notes 2
Week 3	Sept 8 – M	Lecture – 1 st Order Systems, Notes 2 Lab Period – Lab Session
	Sept 10 – W	Lecture – 1 st Order Systems, Notes 2
Week 4	Sept 15 – M	Lecture – 1 st Order Systems, Notes 2 Lab Period – Lab Session
	Sept 17 – W	Lecture – Block Diagrams, Notes 4
Week 5	Sept 22 – M	Lecture – Block Diagrams, Notes 4 Lab Period – Lab Session
	Sept 24 – W	Lecture – Block Diagrams, Notes 4
Week 6	Sept 29 – M	Lecture – 2 nd Order Systems, Notes 3 Lab Period – Lab Session
	Oct 1 – W	Lecture – 2 nd Order Systems, Notes 3
Week 7	Oct 6 – M	Lecture – 2 nd Order Systems, Notes 3 Lab Period – Lab Session
	Oct 8 – W	Lecture – 2 nd Order Systems, Notes 3
Week 8	Oct 13 – M	NO CLASSES: Midsemester Break
	Oct 15 – W	Lecture - Laplace Transform & Transfer Fns., Notes 5 & 6
Week 9	Oct 20 – M	Lecture & Lab Periods – TEST #1
	Oct 22 – W	Lecture - Laplace Transform & Transfer Fns., Notes 5 & 6
Week 10	Oct 27 – M	Lecture – Laplace Transform & Transfer Fns., Notes 5 & 6 Lab Period – Lab Session
	Oct 29 – W	Lecture – Laplace Transform & Transfer Fns., Notes 5 & 6
Week 11	Nov 3 – M	Lecture – Laplace Transform & Transfer Fns., Notes 5 & 6 Lab Period – Lab Session
	Nov 5 – W	Lecture – Laplace Transform & Transfer Fns., Notes 5 & 6
Week 12	Nov 10 – M	Lecture – Laplace Transform & Transfer Fns., Notes 5 & 6 Lab Period – Lab Session
	Nov 12 – W	Lecture – Control System Analysis, Notes 7 & 8
Week 13	Nov 17 – M	Lecture – Control System Analysis, Notes 7 & 8 Lab Period – Lab Session
	Nov 19 – W	Lecture – Control System Analysis, Notes 7 & 8
Week 14	Nov 24 – M	Lecture & Lab Periods - TEST #2
	Nov 26 – W	NO CLASSES: UNH Offices Open (day before Thanksgiving)
Week 15	Dec 1 – M	Lecture – Control System Analysis, Notes 7 & 8 Lab Period – Lab Session
	Dec 3 – W	Lecture – Control System Analysis, Notes 7 & 8
Week 16	Dec 8 – M	Lecture – Last Class; Wrap up and Review Lab Period – Lab Wrap Up (if needed)
	Dec 10 – W	FINAL EXAM (Take Home Format Likely)
Week 17	Dec 15 – M	Contingency Day (finals end Dec. 16)



SELECTED UNIVERSITY POLICIES: The handbook of *Student Rights, Rules, and Responsibilities* is now incorporated in the Academic Catalog. See: <https://catalog.unh.edu/srrr/>
Brief descriptions of a few specific policies are given below, along with links to more complete information.

ACADEMIC INTEGRITY: Academic integrity is a core value at the University of New Hampshire. The members of its academic community both require and expect one another to conduct themselves with integrity. This means that each member will adhere to the principles and rules of the University and pursue academic work in a straightforward and truthful manner, free from deception or fraud. The policy can be found at the following location: [University Academic Integrity Policy](#)

ATTENDANCE: Class attendance is important for your learning. You are responsible for all course assignments and meeting all deadlines unless exceptions are agreed upon with the instructor ahead of time. If you need to miss a class for a planned activity, let the instructor know ahead of time. See the [Attendance and Class Requirements](#) policy in the undergraduate catalog.

CREDIT HOUR POLICY: This syllabus reflects the federal definition of a credit hour, which entails a minimum 3 hours of engaged time per week per credit over a 15-week semester. Examples of engaged time include class time, assignments, examinations, laboratories, participation in course-related experiences (attending a talk or performance, speakers and events, fieldwork, etc.), conferences, and office hours. Student work reflects intended learning outcomes and is verified through evidence of student achievement. For more information, please see: [NECHE policy on Credits and Degrees](#).

EXTENDED ABSENCES: If you are dealing with an unexpected, extenuating circumstance that will keep you out of class or affect your performance for more than a day or two, reach out to Lisa Enright, Assistant Dean of Student Success, at lisa.enright@unh.edu to request a letter be sent to all your faculty.

If you are required to miss significant class time, you will be provided temporary academic supports so that you can continue to make satisfactory progress in this course. Please contact your course instructor to discuss the specific types of supports that will be implemented during your absence.

TUTORING SERVICES: Knack is a peer-to-peer tutoring platform that is available to all enrolled students for all undergraduate courses in Durham and Manchester at no cost to students. Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. UNH has partnered with Knack to provide students with access to verified tutors who have successfully completed your course. To view available tutors, visit unh.joinknack.com [Links to an external site.](#) and sign in with your student account. Questions about Knack Tutoring can be sent to Stephanie Kirylych, Director of Advising, at stephanie.kirylych@unh.edu.



STUDENT ACCESSIBILITY SERVICES: According to the Americans with Disabilities Act (as amended, 2008), each student with a disability has the right to request services from UNH to accommodate his/her/their disability. If you are a student with a documented disability or believe you may have a disability that requires accommodations, please contact Student Accessibility Services (SAS) located on the Manchester campus in room 417 or sas.office@unh.edu.

Accommodation letters are created by SAS with the student. Please follow up with your instructor as soon as possible to ensure timely implementation of the identified accommodations in the letter. Faculty have an obligation to respond once they receive official notice of accommodations from SAS but are under no obligation to provide retroactive accommodations.

For more information refer to www.unh.edu/sas or contact SAS at 603.862.2607, 711 (Relay NH) or sas.office@unh.edu.

CONFIDENTIALITY AND MANDATORY REPORTING OF SEXUAL VIOLENCE OR HARRASSMENT: The University of New Hampshire and its faculty are committed to assuring a safe and productive educational environment for all students and for the university as a whole. To this end, the university requires faculty members to report to the university's Title IX Coordinator (Bo Zarycky, Bo.Zarycky@unh.edu, 603-862-2930/1527 TTY). Faculty, staff or students on the Manchester campus can also contact Lisa Enright, Deputy Title IX Coordinator (lisa.enright@unh.edu; 603-641-4336) to report any incidents of sexual violence and harassment shared by students.

If you wish to speak to a confidential support service provider who does not have this reporting responsibility because their discussions with clients are subject to legal privilege, you can contact the [SHARPP Center for Interpersonal Violence Awareness, Prevention, and Advocacy](#) at (603) 862-7233/TTY (800) 735-2964, as well as, Caroline Young, SHARRP Center Advocacy Expanded Services Coordinator for UNH Manchester (caroline.young1@unh.edu; room 417; Available in person Mondays 9 am to 4-pm and available by appointment (in person and virtually) by emailing caroline.young1@unh.edu). Individuals can also access Reach Crisis Services NH 603-668-2299 (24 hours), 77 Sundial Ave., Suite 306W, Manchester, NH.

For more information about what happens when you report, how the university treats your information once a report is made to the Title IX Coordinator, your rights and reporting options at UNH (including anonymous reporting options) please visit [student reporting options](#). [The uSafeUS app](#) is also available for students to keep reporting options and resources easily accessible on their phones.

Help us improve our campus and community climate. If you have observed or experienced an incident of bias, discrimination or harassment, please report the incident by contacting the Civil Rights & Equity Office at UNH.civilrights@unh.edu or TEL # (603) 862-2930 voice/ (603) 862-1527 TTY / 7-1-1 Relay NH, or visit the CREO website. Anonymous reports may be submitted.