

**MENG 4312 – System Dynamics and Control**  
**Course Syllabus**

<b>Semester / Year</b>	Fall 2022
<b>Catalog Description</b>	This course introduces the fundamental concepts to model dynamic systems and to design basic control systems. The students will learn how to perform optimal and robust control design of dynamic systems. A software package will be selected for use as a learning support tool.
<b>Prerequisites</b>	MENG 3309, MENG 3211, and MENG 3316, EENG 3301, EENG 3308
<b>Section number</b>	001
<b>Instructor name</b>	Dr. Chung Hyun Goh
<b>Contact info</b>	Email: <a href="mailto:cgoh@uttyler.edu">cgoh@uttyler.edu</a> Voice: 903-566-6125 Office: RBN 3007
<b>Class Type / Location</b>	Face-to-face (or Hybrid) / RBN 3040
<b>Class Time</b>	M/W 9:05 AM – 10:30 AM
<b>Office Hours</b>	M/Tu/W 11:00 AM – 12:00 PM or by appointment
<b>Credits</b>	3 credits (Lecture)
<b>Required Textbook</b>	System Dynamics – Katsuhiko Ogata 4 <sup>th</sup> Ed., Prentice Hall, 2003, but older editions are acceptable: <a href="https://uttyler.bncollege.com/c/System-Dynamics/p/MBS_588545_new?currentCampus=782&amp;currentTerm=782_1_22_F&amp;currentCourse=782_1_22_F_200_4312_3">https://uttyler.bncollege.com/c/System-Dynamics/p/MBS_588545_new?currentCampus=782&amp;currentTerm=782_1_22_F&amp;currentCourse=782_1_22_F_200_4312_3</a>
<b>Optional References</b>	Recommended online textbook (available via library using patriots account) - Mandal, Ajit K.. <i>Introduction to Control Engineering : Modeling, Analysis and Design</i> , New Age International Ltd, 2006. ProQuest Ebook Central, <a href="https://ebookcentral.proquest.com/lib/uttyler/detail.action?docID=395560">https://ebookcentral.proquest.com/lib/uttyler/detail.action?docID=395560</a> - Lobontiu, Nicolae. <i>System dynamics for engineering students: Concepts and applications</i> . Academic Press, 2017. (Elsevier website: <a href="https://www.sciencedirect.com/book/9780128045596/system-dynamics-for-engineering-students">https://www.sciencedirect.com/book/9780128045596/system-dynamics-for-engineering-students</a> )
<b>Additional requirements</b>	Assignments and tutorials on MATLAB and Simulink by Mathworks, Inc. (available through virtual desktop – one.uttyler.edu)
<b>Evaluation Method</b>	Project / Report 20%, Mid-Term Exam 20% Final Exam 20% Homework 10% / Quizzes 10% Design Workshop (Flipped Classes) 10% Course Participation 10% (In-class example, MATLAB online assignments, etc.)
<b>Grading Policy / Scale</b>	Letter grades/ Scale: A => 90, B => 80, C => 70, D => 60, F < 60.
<b>Important events / dates</b>	Census date: 09/02/2022

	Exam date: TBD Final date: Per published schedule by the registrar – TBD
<b>Attendance / Makeup policy</b>	Regular attendance is imperative if you want to do well in this course. Therefore, regular attendance is highly recommended. In case you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made in the class on homeworks, tests etc. No makeup
<b>Course Learning Objectives / ABET SOs &amp; PEOs relation</b>	By the end of this course, students will be able to: <ol style="list-style-type: none"> <li>1. Apply fundamental principles of dynamic systems to modeling.</li> <li>2. Analyze dynamics systems in time domain and frequency domain.</li> <li>3. Conduct the analysis and design of SISO control systems.</li> <li>4. Use computational tools to assist in the design and analysis of dynamics systems and pertinent controllers.</li> <li>5. Apply control system knowledge to real-world problems in case studies.</li> </ol>
<b>Tentative Topics</b>	<ol style="list-style-type: none"> <li>1. Transfer-function modeling approach</li> <li>2. State-space modeling approach</li> <li>3. Time domain analysis of dynamic systems</li> <li>4. Frequency domain analysis of dynamics systems</li> <li>5. Time domain control design</li> <li>6. Frequency domain control design</li> </ol>
<b>Other</b>	Note: Use the UT Tyler email only or Canvas messaging, which is used as official mode of campus communication. If you call, please leave a voicemail with name and contact if call is not answered. Please allow instructor at least 24-48 hours to respond to your email/phone.

**NOTE:** The syllabus is subject to change during the course of semester as deemed necessary.

### Evaluation Activities

- Exam: There will be 2 Exams during the semester. Mid-term Exam is an in-class exam that covers Chapters 2 to 7 and Final Exam is an in-class (or a Take-Home) exam that covers Chapters 8 to 11. No late submission will be accepted and will result in automatic grade of zero. Makeup exams/presentations if approved by instructor will be administered during finals week.
- Project: Each student will choose a complex dynamic system to model and control or an instructor will provide students with a specific topic for the contest type of project. Students may choose to collaborate with classmates to form a group (max 3 to 5 students considering class sizes) by informing the instructor no later than 2nd week of class. Instructor will assign a set of complex dynamic system project for students to choose from, but if a student wants to make up own project then must let instructor know for further directions no later than 3rd week of class. Each student/group analyzes the project and simulate the models of the subsystems and system using MATLAB and Simulink® or other computer programming to then submit reports. Detailed grading rubrics will be discussed and announced during the

semester. Instructions on the report format/style, grading rubric form and checklist will be posted separately.

- Assignments, Class Participation and Conduct: Attendance and participation to lectures are expected per university policy. Check class and Canvas regularly for any announced assignments including Exams according to the topics covered in lectures. Short lecture videos on each topic or chapter will be posted on Canvas as announced for review to receive completion grade. Questions involving knowledge covered in class can be checked if your work is shown to the instructor, but no solutions will not be given outright. Come prepared to class by reviewing relevant material, bringing textbook, taking notes, solving problems and participating in discussions, which are all expected. Any violation of the Student Behavior (see below) will result in 1% grade reduction for each incident. Students may appeal the grade reduction to the instructor if valid excuse or reason can be given.

Note: Instructions on the oral/video report format/style, checklist and grading rubric form will be posted separately on Canvas. Late submissions of assignments will result in 20% deduction from the graded score after each 24-hour period. All late assignments along with any optional bonus activities must be submitted on Canvas by last day of class (Dec 2, Friday at 5pm).

Grade appeal: grades can be appealed by meeting the instructor during office hours, but no later than a week after the grade has been posted.

Note: your final semester grade is based on the 10-point scale. No curving or scaling will be applied even if you receive borderline grade such as 79.99.

Note:

Your experience in this class is important to me. If you have already established accommodations with Student Accessibility Services, please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course. If you have not yet established services through SAS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but are not limited to: mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices> or call 903.566.7079. SAR offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s), and SAR. It is important to University of Texas at Tyler to create inclusive and accessible learning environments consistent with federal and state law.

### **University Policies:**

#### **UT Tyler Honor Code**

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

### **Students Rights and Responsibilities**

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

### **Campus Carry**

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

### **UT Tyler a Tobacco-Free University**

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support.

For more information on cessation programs please visit [www.uttyler.edu/tobacco-free](http://www.uttyler.edu/tobacco-free).

### **Grade Replacement/Forgiveness and Census Date Policies**

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

### **State-Mandated Course Drop Policy**

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another

2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

### **Disability/Accessibility Services**

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttlyer.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

### **Student Absence due to Religious Observance**

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second-class meeting of the semester.

### **Student Absence for University-Sponsored Events and Activities**

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

### **Social Security and FERPA Statement**

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

### **Emergency Exits and Evacuation**

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

### **Student Standards of Academic Conduct**

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

- i. "Cheating" includes, but is not limited to:

- copying from another student’s test paper;
  - using, during a test, materials not authorized by the person giving the test;
  - failure to comply with instructions given by the person administering the test;
  - possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed “crib notes”. The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
  - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
  - collaborating with or seeking aid from another student during a test or other assignment without authority;
  - discussing the contents of an examination with another student who will take the examination;
  - divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
  - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
  - paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
  - falsifying research data, laboratory reports, and/or other academic work offered for credit;
  - taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
  - misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.
- ii. “Plagiarism” includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another’s work and the submission of it as one’s own academic work offered for credit.
- iii. “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
- iv. All written work that is submitted will be subject to review by plagiarism software.

### UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), [writingcenter@uttyler.edu](mailto:writingcenter@uttyler.edu)
- UT Tyler Tutoring Center (903.565.5964), [tutoring@uttyler.edu](mailto:tutoring@uttyler.edu)
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)

### **COVID Information**

It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure ([CDC quarantine/isolation guidelines](#)). Please work with your faculty members to maintain coursework and please consult [existing campus resources](#) for support.