ME and AE5305: Modeling and Simulation
Fall 2014

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Course site for reference notes: ELEARN.UTA.EDU

Office Hours: Tue. & Thurs. 11 am – 12:15 pm and by appointment

Section Information: ME5305-001, AE5305-001, ME5305-002 , AE5305-002

Time and Place of Class Meetings: Tue & Thurs. 9:30 – 10:50 am   NH 203

Description of Course Content: Modeling and simulation of dynamic systems and processes

Student Learning Outcomes: This course is intended to provide a comprehensive treatment of the modeling techniques of the various types of engineering systems, the solution techniques for the resulting differential equations, and mathematical procedures related to the representation of dynamic systems and determination of their response characteristics for deterministic and stochastic inputs.

Requirements: Homework assignments will be included in computing the final grade; unless otherwise stated, all assignments are due at the beginning of the class on the due date. Late homework submissions will not be accepted. For distance education students, submissions should be postmarked no later than the due date and should be sent to Professor Hullender at Box 19023, UTA, Arlington, TX 76019.   Students are expected to do their own work.

Required Textbooks and Other Course Materials*: Modeling and Simulation of Engineering Systems, August 5, 2014,* by Professor David A. Hullender, Available at Bird's Copies, 208 S. East St., Arlington 817-459-1688. Also, it is recommended that each student purchase a student version of MATLAB or have access to MATLAB. UTA does have a license for MATLAB for use on campus.

Descriptions of major assignments and examinations: In-class examinations will be given; all exams are comprehensive. There are no make-up exams. Should absence from an exam be excused, the final average for the course will be based on one less exam. Unless stated otherwise, all exams are closed book and a calculator is not allowed. Distance education students should notify Professor Hullender if they plan to be on campus to take exams; otherwise, the name and e-mail address of the proctor should be provided in advance.

Attendance: Lecture attendance is preferred for on-campus students. Distance education students must obtain an approved proctor for exams on the scheduled day of the exams or attend the exams on campus; advance notification of where an exam will be taken is required one week prior to that exam.

Grading:
Make-up Exams and Course Grade Calculation: There are no make-up exams. Should absence from an exam be excused which requires written documentation, the final average for the course will be based on one less exam. Since all exams are comprehensive, there will not be a final exam given during finals week. The final grade for the course will be based on a weighted average of the homework and exam grades: Exams 85% , Homework 15%. Letter grades will be assigned based on the distribution of all students' grades. For example, if there are students with very high averages, then an average between 94 to 100 typically might be required for an A; on the other hand, if the highest averages are in the low 90's, then an average of 85 or higher may earn and A, etc.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances **as published in the current graduate catalog**

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in

the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (http://wweb.uta.edu/ses/fao).

Americans with Disabilities Act: The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability or by calling the Office for Students with Dis. at (817) 272-3364.

Academic Integrity: At UT Arlington, academic dishonesty is completely unacceptable and will not be tolerated in any form, 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" (UT System Regents' Rule 50101, §2.2). Suspected violations of academic integrity standards will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may contact the Maverick Resource Hotline by calling 817-272-6107, sending a message to resources@uta.edu, or visiting www.uta.edu/resources.

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at http://www.uta.edu/oit/cs/email/mavmail.php.

Student Feedback Survey: At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory will be asked to complete an online Student Feedback Survey (SFS) about the course and how it was taught. Instructions on how to access the SFS system will be sent directly to students through MavMail approximately 10 days before the end of the term. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback data is required by state law; student participation in the SFS program is voluntary.

Final Review Week: A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Tentative Lecture and Exam Schedule
ME 5305
Fall 2014

Aug.	21	Overview and objectives of class
	26	Basic math concepts including linearization,
	28	Laplace transform properties, differential equations, & inputs
Sept.	2	Inverse Laplace Transforms (residue theorem and MATLAB)
	4	MATLAB commands for solving linear differential equations
		Conversion of continuous differential equations to discrete eqn's, Z transform
	9	Lumped parameter models for mechanical systems
		Transfer functions, eigenvalues, and time constants,
	11	State variable representation of dynamic systems
	16	Frequency response analysis of dynamic systems
	18	**Exam #1, closed book, comprehensive, and no programmable calculators**
	23	Modes of a system and transfer function approximations
	25	MATLAB simulation methods: 'lsim', 'initial', and 'ode45'
	30	Review of basic statistics principles and stochastic processes
Oct.	2	Stationary stochastic processes
	7	Power spectral densities and including spatial frequencies
	9	MATLAB exercises for simulation of stochastic processes
	14	System Identification
	16	Mechanical systems with rotation
	21	Lumped parameter models for systems with beams
	23	**Exam #2, closed book, comprehensive, and no programmable calculators**
	28	Lumped parameter capacitance models for systems with liquids
	30	Lumped parameter liquid inertance and resistance models
Nov.	4	Models for fluid line transients
	6	Models for Linear Valve Controlled Actuators
	11	Lumped parameter capacitance models for systems with gases
	13	Lumped parameter gas inertance and resistance models
	18	Lumped parameter thermal models
	20	Modeling of passive electrical circuits
		Operational amplifier circuits
	25	**Exam #3, closed book, comprehensive, and no calculators**
	28	Thanksgiving holiday
Dec.	3	Class will not meet
	5	Class will not meet
	12	**Since all exams are comprehensive, there will not be a final exam**