

**MAE 4310-001**  
**Spring 2015**  
**T-TH 11:00-12:20**  
**NH 105**

**Instructor:** David Hullender  
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**Office Hours:** T-TH 9:30 am-11:00 am and by appointment  
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**Instructor WWW site:** under construction

**Course WWW site for reference notes:** [elearn.uta.com](http://elearn.uta.com)

**Course Prerequisites:** MAE3360

**Required Textbook:** *Modern Control Engineering* available at the UTA Bookstore

**Recommended additional materials:** *Student Ed. of Matlab with Control Tool Box* available at the UTA Bookstore and “Review of Basic Math and Matlab Techniques”, a notebook of lecture material and solved problems by Dr. Hullender, available at Birds Copies, 208 S. East St., Arlington 817-459-1688

**Course Description:** Application of mathematical techniques and MATLAB tools for the performance analysis and design of dynamic systems including design modifications with feedback control.

**Student Learning Outcomes:** This course is intended to provide a comprehensive treatment of the analysis and design techniques for achieving dynamic systems performance specifications.

**Requirements:** Class and exam attendance is mandatory. Reasons for absence must be documented in writing to the instructor. 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. Students are expected to do their own work.

**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. Key Assignments will be included as part of the exams and these key assignments must be passed in order to receive a passing grade for the course.

**Final Grade Computation at the End of the Semester:** There will be 3 in-class exams (75%) and homework (25%). The 3<sup>rd</sup> exam will be given at the time for the final exam during finals week. Letter grades at the end of the semester will be determined by the distribution of the averages of the students in the class. For example, in the case of several high averages, the distribution might be 93-100 for A, 83-92 for B, etc. If the highest averages are in the low 90's, then the distribution might be 86-94 for A, 76-85 for B, 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 undergraduate 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://www.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](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities 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](mailto:resources@uta.edu), or visiting [www.uta.edu/resources](http://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.

**Teaching Assistant: TBA**

## MAE 4310

### Spring 2014

#### Tentative Lecture/Topic Schedule

Jan.	14	Overview of course and control system examples, <b>Chapter 1</b>
	16	Review of basic mathematics and Matlab techniques, <b>Notebook</b>
	21	Review continued, <b>Notebook</b>
	23	Mathematical Modeling of Control Systems, <b>Chapter 2</b>
	28	Modeling in State Space, <b>Section 2-4 and Notebook</b>
	30	Transformation of Math Models with Matlab, <b>Section 2-6 &amp; Notebook</b>
<b>Feb.</b>	<b>4</b>	<b>Exam 1, comprehensive, closed book, no calculators, Key Assignment</b>
	6	Transient and Steady-state Response Analyses, <b>Chapter 5 &amp; Notebook</b>
	11	Ralph's Stability Criterion, <b>Section 5-6 pg. 212</b>
	13	Simulink methods and examples
	18	Performance Index techniques for design optimization, <b>handout</b>
	20	Performance Index examples
	25	Effects of Integral and Derivative Control and steady state errors, <b>pg 218</b>
	27	Root-Locus Method, <b>Chapter 6, pg 269</b>
<b>March</b>	<b>4</b>	Root-Locus continued
	6	Application of root-locus to the design of common compensators, <b>pg. 309</b>
	11	Spring Break
	13	Spring Break
	18	Additional root-locus design examples
	<b>20</b>	<b>Exam 2, comprehensive, closed book, no calculators, Key Assignment</b>
	25	Controlability and Observability, <b>Chapter 9, pg. 675</b>
	27	Controlability and Observability, continued
April	1	Control Systems Analysis and Design by the Frequency-Response Method, <b>Chapter 7</b>
	3	Relative stability using the phase and gain margins, <b>pg 462</b>
	8	Lead and Lag Controllers design in the frequency domain, <b>pg 493</b>
	10	Lead and lag controllers continued
	15	Lead and lag controllers continued
	17	PID controllers, <b>Chapter 8</b>
	22	Digital implementation of controllers, <b>class notes</b>
	24	<b>Exam 3, comprehensive, closed book, no calculators</b>