

EE311/311L – Systems – 3.5 Credits
 South Dakota School of Mines & Technology
 Fall Semester 2009
 EP 253 2:00pm-2:50pm MWF

Instructor	Dr. Charles Tolle, Office: EP 323, Phone: 394-6133, Email: charles.tolle@sdsmt.edu
Prerequisites	EE 221: Circuits II
Co-requisites	EM 216: Statics & Dynamics (or completed)
Office Hours	MWF 1:00pm-2:00pm, M 3:00pm-4:00pm, or by appointment.
Holidays	Labor Day – Sept. 7 Veteran’s Day – Nov. 11 Native Americans’ Day – Oct. 12 Thanksgiving Break – Nov. 26-29
Textbook	<i>Control Systems Engineering, 5th Edition</i>, by Norman S. Nise, John Wiley & Sons, Inc., 111 River Street, Hoboken, NJ, 07030, 2008.
Chapter Order	1,2,3,5,4,7,6,8,10(Bode),9
Supplementary Books (newer additions may exist)	<i>Signals and Systems</i>, A.V. Oppenheim, A.S. Willsky, Prentice-Hall, Inc., Englewood Cliffs, NJ 07632, 1983. <i>Signals and Systems: Continuous and Discrete</i>, R.E. Ziemer, W.H. Tranter, D.R. Fannin, Prentice-Hall, Inc., Englewood Cliffs, NJ 07632, 1998.
Matlab Reading (newer additions may exist)	<i>Essentials of MATLAB Programming: Second Edition</i>, S. J. Chapman, Cengage Learning, Stamford, CT, 2009. <i>MATLAB Programming for Engineers: Fourth Edition</i>, S. J. Chapman, Thomson Learning, Toronto, Ontario, Canada, 2008. <i>Dynamical Systems with Applications Using MATLAB</i>, S. Lynch, Birkhauser, Boston, MA, 2004.
Grading Policy	5 % Attendance, Participation, and Professionalism
	10 % Homework Assignments (~ 5 assignments – only some problems will be graded)
	20 % Labs (~5 open labs throughout the course.)
	5 % Quizzes (as needed)
	20 % for each of the 3 Midterm Exams (on or about Oct. 2 and Nov. 6th during class and the final exam will a midterm type on Dec. 15 from 2:00pm-3:50pm)
	The instructor reserves the right to modify this grading break down if warranted.
	Grades will be assigned according to natural grade groupings. However it is anticipated that the following scale will be used to assign final grades. 100 – 90 A 89 – 80 B 79 – 70 C 69 – 60 D below 59 F The instructor reserves the right to modify this scale if warranted.
Objectives	The objectives of this course are to obtain knowledge in: <ul style="list-style-type: none"> ▪ beginning system modeling ▪ transient and steady state response analysis ▪ stability analysis <ul style="list-style-type: none"> i.e. Routh-Hurwitz criterion, root-locus techniques, and frequency domain techniques ▪ state space methods ▪ beginning design of systems to satisfy the given specifications ▪ modern computational software tools for analysis and design of feedback systems <ul style="list-style-type: none"> i.e. MATLAB (possible alternative software programs: Octave, Maple, or Sage).

<p>General Policies</p>	<p>Students are encouraged to work together on assigned homework problems. However, all homework, projects, and tests must <u>not</u> be plagiarized (from any source – even your classmates). Plagiarism is on the rise and it is not acceptable in any form! If caught plagiarizing, you will receive an F for the course and referred to the Department Head and Dean for further action. In short, you are expected to accomplish your own work! When using other's works cite them! Make-up tests will <u>not</u> be given unless a prior arrangement is made with the instructor. Students have two weeks following the return of any graded material to appeal the score.</p> <p><i>Note that according to “Policy Governing Academic Integrity” in the SDSM&T Undergraduate Catalog, the instructor of record for this course has discretion of how acts of academic dishonesty are penalized, subject to the appeal process, and that “Penalties may range from requiring the student to repeat the work in question to failure in the course” (72-73).</i></p> <p>Homework problems will be due on at the start of class on the due date. Late homework will receive up to ½ credit within one week of due date, i.e. up to the start of class one week later. After that time, late homework will <u>not</u> be accepted without the permission of the instructor.</p>
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<p>Freedom in learning</p>	<p><i>Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the dean of the college which offers the class to initiate a review of the evaluation.</i></p>
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<p>Electronic Devices Policy.</p>	<p><i>Please turn off your cell phone before class starts. No text messaging in class. No headphones. If you wish to use a laptop in this class for purposes of note taking, is acceptable. No other use of any other electronic/computer media is allowed during class time.</i></p>
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<p>ADA Statement</p>	<p><i>Students with special needs or requiring special accommodations should contact the instructor, (Dr. <u>Charles R. Tolle</u>, at 394-6133 or by email at charles.tolle@sdsmt.edu) and/or the campus ADA coordinator, Jolie McCoy, at 394-1924 at the earliest opportunity.</i></p>
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<p>COURSE OUTCOMES: Upon completion of this course, students should demonstrate the ability to:</p>	<ol style="list-style-type: none"> 1. Use techniques such as linearization, dynamic response, Laplace transforms to model systems. 2. Use block diagrams to represent systems. 3. Use signal flow graphs to represent systems. 4. Determine the sensitivity of the output to changes in the transfer function. 5. Determine how disturbances affect the output of a system 6. Analyze the performance of a system in the time domain. 7. Analyze the performance of a system in the frequency domain. 8. Analyze the stability of a linear control system. 9. Use root-locus methods to analyze feedback control systems via gain adjustment. *10. Apply the principles of a PID (proportional, integral, derivative) to a controller strategy. 11. Use frequency methods (Frequency response, Bode, *Nyquist) to analyze feedback control systems. 12. Use state variable models to represent a system. 13. Be comfortable using Matlab® as an analytical tool. <p>* as time permits</p>
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<p>RELATION OF COURSE TO PROGRAM OUTCOMES: These course outcomes fulfill the following program outcome:</p>	<ol style="list-style-type: none"> (a) An ability to apply knowledge of mathematics, science, and engineering. (b) An ability to design and conduct experiments, as well as to analyze and interpret data. (c) An ability to design a system, component, or process to meet desired needs. (d) An ability to function on multi-disciplinary teams (e) An ability to identify, formulate, and solve engineering problems. (f) An understanding of professional and ethical responsibility (g) An ability to communicate effectively (h) The broad education necessary to understand the impact of engineering solutions in a global and societal context (i) A recognition of the need for, and an ability to engage in life-long learning (j) A knowledge of contemporary issues (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
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The following table indicates the relative strengths of each course outcome in addressing the program outcomes listed above (on a scale of 0 to 4 where 4 indicates a strong emphasis)

		Course Outcomes												
		1	2	3	4	5	6	7	8	9	10	11	12	13
ABET Outcomes	(a)	4	3	3	4	4	4	4	4	4	4	4	4	3
	(b)	3	2	2	2	2	3	3	3	2	2	2	3	4
	(c)	1	1	1	1	1	1	1	1	1	1	1	1	1
	(d)	2	1	1	1	1	1	1	1	1	1	1	2	1
	(e)	4	3	3	3	3	3	3	3	4	2	4	4	4
	(f)								2	1	1	1		1
	(g)	1	1	1			1	1	1	1	1	1	1	1
	(h)	2	1	1	1	1	1	1	2	1	1	1	2	1
	(i)	1	1	1	1	1	1	1	1	1	1	1	1	1
	(j)	1			1	1	1	1	1	1	1	1	1	
	(k)	4	3	3	4	4	4	4	4	4	4	2	4	4

PREPARED BY:
Charles Tolle, Date: Sept. 1, 2009.