1. **Instructor:** Stefan Seelecke  
   **Office:** EB III 3236  
   **Telephone Number:** 919.515.5282  
   **Email:** stefan.seelecke@ncsu.edu  
   **Class Meeting Times and Location:** TTH, 2:20-3:35PM, EB III 2213  
   **Office Hours:** W 2-3PM  
   **URL:** www.adaptivestructures.ncsu.edu

2. **Course Prerequisites:**  
   MAE 415 or MAE 472. Students should also be familiar with Matlab/Simulink, basic control concepts (PID)

3. **Student Learning Objectives:**  
   At the completion of this course, students should be able to:  
   1. Understand the behavior and applicability of various smart materials  
   2. Design simple models for smart structures & materials  
   3. Perform simulations of smart structures & materials application  
   4. Conduct experiments to verify the predictions

4. **Suggested References:**  
   - M.V. Ghandi, B.S. Thompson, Smart Materials and Structures, Chapman & Hall, 1992  
   - R.C. Smith, Smart Material Systems: Model Development (Frontiers in Applied Mathematics), SIAM, 2005  
   - D. J. Leo, Engineering Analysis of Smart Materials Systems, Wiley, 2007  
   These books are recommending reading for background information. None of them is required as a textbook. Electronic handouts will be given and posted on the web server.

5. **Grading:**  
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<tr>
<th>Grade</th>
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<tr>
<td>Midterm Exam</td>
<td>50%</td>
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<td>Final Exam</td>
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<td>Total</td>
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<tr>
<td>Special A+</td>
<td>87%-89%</td>
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<td>B+</td>
<td>77%-79%</td>
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<td>94%-100% A</td>
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<td>B</td>
<td>74%-76%</td>
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6. **Course Organization and Scope:**
This course will enable students to understand and efficiently use active materials in a manner that is relevant to their particular field of interest. To this end, it will cover the following topics:

1. Introduction to material behavior. *(Lectures 1-14)*
2. Introduction to modeling. Students will work with and further develop existing code using FORTRAN, JAVA or Matlab/Simulink. *(Lectures 15-18)*
3. Project phase I: Above models will be used to simulate and study typical applications of active materials, e.g., control of SMA actuator/sensor system, Nitinol stents, PZT nanopositioning actuators, active vibration control, electro-active polymer actuators. *(Lectures 19-26)*

Total of 26 lectures, based on a Tuesday/Thursday schedule.

See separate Excel spread sheet for exact schedule of classes.

7. **Homework:**
There will be no formal homework for this class. You are, however, strongly encouraged to review the lecture material on a daily basis, as this will be the basic ingredient to the exams.

8. **Exams:**
There will be 2 project-type exams, one midterm and one final exam, the first one covering Lectures 1-14, and the second the remainder of classes. Further details will be given in an updated version of the syllabus.

9. **Policy on Absences:**
Missed exams need to be justified by the student with some written corroboration (doctor’s note or similar). Non-justified missed exams will be assigned a grade of ZERO.

10. **Academic Integrity Statement:**
Exams are to be solved individually, without any help other than that provided directly by the Instructor. Any attempt at cheating will result in a ZERO grade for that exam, and possibly further action. For more details, see:


The following Honor Pledge will be in effect at all times:

"I have neither given nor received unauthorized aid on this test or assignment"

11. **Students with Disabilities:**
Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with http://www.ncsu.edu/dss/
Disability Services for Students
1900 Student Health Center,
Campus Box 7509,
515-7653.

For more information on NC State's policy on working with students with disabilities, please see: http://www.ncsu.edu/provost/hat/current/appendix/append_k.html

12. Laboratory Safety:
Handouts and safety instructions will be given at the beginning of the lab project section. The University regulations for Lab Safety will be followed according to the posted lab safety plan.

13. Extra Expenses:
Students are required to purchase Engineering paper for their homework assignments.