

**MEC 450/550 Mechatronics**  
Spring 2018

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**Instructor:** Noah D. Machtay, Ph.D., P.E., 146 Heavy Engineering Building, 2-9014  
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(Emails must include your name, SBID#, and our course #. Emails will generally be answered within 2 business days)

**Office Hours:** M-F 8-9am, HE 146  
**Lecture:** TuTh 2:30pm-3:50pm, Chem 126  
**Lab:** Tu 9am-12pm, HE 139

**Course Description:** An introduction to the design, modeling, analysis, and control of mechatronic systems (smart systems comprising mechanical, electrical, and software components). Fundamentals of the basic components needed for the design and control of mechatronic systems, including sensors, actuators, data acquisition systems, microprocessors, programmable logic controllers, and I/O systems, are covered. Hands-on experience in designing and building practical mechatronic systems are provided through integrated lab activities.

**Attendance policy:** Both lectures and lab sessions are required – there will be no make-ups for announced or unannounced in-class assignments. Lab sessions are absolutely mandatory. Students who are late for or miss a lab session will receive a significantly reduced grade at the instructor’s discretion.

**Optional Reading:** W. Bolton, “Mechatronics: A Multidisciplinary Approach,” 4th Edition, ISBN: 0-13-240763-9, Prentice Hall, 2008. Not Required

**Lab Projects:** Students will form into groups of 3. At least 2-3 hands-on projects will be assigned. All projects are team-based. Participation in all lab sessions is required. Missing any lab session will result in a significant grade reduction. Each team will be responsible for delivering an oral presentation for each project. It is each student’s responsibility to ensure that the group functions well and achieves the assigned goals, however differential grading may be employed at the instructor’s discretion as necessary to address imbalances in student effort within a given group.

**Design Project:** Each group will prepare a working mechatronic system prototype. The system will be designed to meet the requirements of the design project that will be assigned during the semester. Students are responsible for designing, purchasing materials, constructing, and demonstrating their system. In lieu of requiring a textbook purchase, this course requires that each student spend up to \$100 to secure materials for their design project; there will be no reimbursement whatsoever for purchased materials, and the materials will remain the property of the students at the end of the semester, unless they wish to donate their prototype to the laboratory to facilitate the educational experience of future classes of students. Each completed project must cost no more than \$200 as-submitted, and a cost report must be submitted with the project to document that the group has complied with this stipulation (each item must be listed based on its MSRP, not the purchase price, so getting things for free/reduced cost doesn’t circumvent the cost evaluation). To ensure a level playing field, use of university facilities to fabricate the prototype is strictly prohibited; this includes but is not limited to any and all university equipment and tools, student shops, machine shops, laboratories, student design team facilities, etc.

**Exams:** *One midterm exam and a final exam.* Midterm will be held on 3/22/2018, Final will be held as scheduled by registrar. No make-up exams will be given. Exams will be closed book and closed notes unless otherwise stated by the instructor.

**Grading:** *Midterm: 15%, Projects: 50%, Final: 25%, Participation: 10%.* Projects and lab work are graded on a competitive basis.

**Cell phone policy:** Cellular phones or other communication devices are not permitted in lectures or labs, and are especially prohibited from exams. If you are found to be in possession of such a device during an exam, you will be ejected from the exam and will receive a grade of zero.

**Approved Calculators:** *Only* the following calculators will be allowed on the midterm and final exam. Use of an unapproved calculator during an exam will result in ejection with a grade of zero. This list of calculators is identical to that allowed for the FE exam, as well as the PE exam; the sooner you become comfortable on one of these calculators, the better. The NCEES policy on calculators can be found here:

<http://ncees.org/exams/calculator-policy/>

**Casio:** All **fx-115** models. Any Casio calculator must contain **fx-115** in its model name.

**Hewlett Packard:** The **HP 33s** and **HP 35s** models, but no others.

**Texas Instruments:** All **TI-30X** and **TI-36X** models. Any Texas Instruments calculator must contain either **TI-30X** or **TI-36X** in its model name.

**Americans with Disabilities Act:** If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services (DSS), ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential. Students requiring emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information, go to the following web site: [www.stonybrook.edu/dss](http://www.stonybrook.edu/dss)

**Important Note:** DSS contends that it is the student's individual responsibility to inform their course instructor of the specifics of any exam appointments. They will send a notice informing the instructor that an accommodation has been deemed appropriate, but they will not inform the instructor that a student has elected to utilize that accommodation on any given exam. A student who is granted an accommodation by DSS, and who chooses to make an appointment with DSS to utilize that accommodation on an exam **MUST** inform the instructor of this course no later than one week (7 days, 168 hours) before the exam date. If the student fails to appropriately notify the instructor one week in advance of the exam date, then the instructor cannot be responsible for the accommodation.

**Statement on Academic Dishonesty:** Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, *but are not limited to*, copying or plagiarizing class assignments including homework, reports, designs, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn. Please note that failing to provide proper citations in a paper or report constitutes plagiarism and will be prosecuted accordingly. Be sure to cite your sources!<sup>1</sup>

**Excused absences for religious observance:** From the university policy statement regarding religious holidays (<https://www.stonybrook.edu/commcms/registrar/calendars/ucalcontent/RelHolPol%20081612%20cr.pdf>) "Students will be expected to notify their professor in advance, but definitely before the final date of the 'add/drop' period of their intention to be out for religious observance". Notification of intention to be out for a religious holiday **MUST** be made through the CEAS Undergraduate office, who will verify and evaluate the notification, and provide me with appropriate instructions; you must include your name, SBID#, and our course number when contacting CEAS in regards to your absence.

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<sup>1</sup> Dr. Jon Longtin, Department of Mechanical Engineering, Stony Brook University

<b>COURSE LEARNING OBJECTIVES</b>
1. Familiarity with basic types of sensors and actuators
2. Familiarity with basic circuits
3. Familiarity with digital signals
4. Familiarity with microcontroller systems
5. Familiarity with the mechatronics system level approach

**Grading Policy:**

<b>Undergraduate:</b>	<b>Graduate</b>
100-95 = A	100-95 = A
94-90 = A-	94-90 = A-
89-87 = B+	89-87 = B+
86-84 = B	86-84 = B
83-80 = B-	83-80 = B-
79-77 = C+	79-77 = C+
76-74 = C	76-74 = C
73-70 = C-	73-70 = C-
69-65 = D+	<70 = F
64-60 = D	
<60 = F	

Note: All grades are TRUNCATED, not rounded.

**University required statements:**

“DISABILITY SUPPORT SERVICES (DSS) STATEMENT (must be the following language)

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

[In addition, this statement on emergency evacuation is often included, but not required:

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website:

<http://www.stonybrook.edu/ehs/fire/disabilities> ]

**ACADEMIC INTEGRITY STATEMENT (must be the following language as approved by the undergrad council):**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

**CRITICAL INCIDENT MANAGEMENT (must be the following language as approved by the undergrad council):**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.”