

MEC 104 -Online

Practical Science of Things

Fall 2021

Catalog Data: MEC 104: Practical Science of Things. Credit 3. A practical introduction to the science and engineering of objects and phenomena in everyday life. The basic principles that underlie the operation common to modern devices such as roller coasters, balloons, vacuum cleaners, airplanes, bicycles, thermostats, air conditioners, and automobiles are developed by investigating how they work. Issues of design, safety, and environmental impact are also discussed.

Prerequisite: Satisfaction of entry skill in mathematics requirement (Skill 1) or satisfactory completion of D.E.C. C or QPS

Textbook: *How Things Work: The Physics of Everyday Life*, Louis A. Bloomfield, SBU edition, John Wiley & Sons, New York (latest edition). You will be given assignments to review lectures or videos posted in Blackboard, read material online, or view videos online.

Instructor: Professor Juldeh Sesay, Department of Mechanical Engineering
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Room 226 Heavy Engineering, 2-8493
[office hours](#) : Wednesdays & Thursdays 01:00 – 02:00 PM in person or by phone calls

Goals:

1. acquire an understanding of basic science and engineering as they are manifest in the operation of every day technologies;
2. learn to think logically in order to solve problems;
3. develop and expand physical intuitions;
4. learn how things work.

Topics:

1. The Laws of Motion, I
 - 1.1 Skating
 - 1.2 Falling Balls
 - 1.3 Ramps
2. The Laws of Motion, II
 - 2.1 Seesaws

2.2 Wheels

2.3 Bumper Cars

3. Mechanical Objects

3.1 Spring Scales

3.2 Bouncing Balls

3.3 Carousels and Roller Coasters

3.4 Bicycles

3.5 Earth, Sun, and Moon

4. Fluids

4.1 Balloons

4.2 Water Distribution

4.4 Elevators

5. Fluids and Motion

5.1 Garden Watering

5.2 Balls and Frisbees

5.3 Airplanes and Rockets

5.4 Vacuum Cleaners

6. Heat and Thermodynamics

6.1 Woodstoves

6.2 Incandescent Light Bulbs

6.3 Air Conditioners

6.4 Automobiles

6.7 The Atmosphere

7. Resonance and Mechanical Waves

7.1 Clocks

7.2 Violins and Pipe Organs

Grades: Best 3 (out of 4) exams (25% each)

7 Class quizzes (of 25 % total)

PLUS extra credit work (10%)

Midterms and final Exam

All exams are performed online in Blackboard under strict time limits.

Each section exam will consist of 50 multiple-choice questions about the material covered since the previous exam (including videos). Each section exam and final exam will be given online in Blackboard under strict time limits and deadlines. Late section exams will not be accepted. Please don't even ask.

The dates for the three midterms and final exam are as follows;

Midterm 1: Wednesday, September 22, 2021

Midterm 2: Wednesday, October 27, 2021

Midterm 3: Wednesday, November 17, 2021

Final Exam: Wednesday, December 01, 2021

Grading :

Grades will be determined using :

1. Quizzes 25 %
2. Three Midterm Exams 75% (25% each)
3. Final Exam 25%
4. Extra credit 10%

Here is the grade curve for the course:

A [95, 100], A- [90, 94], B+ [85, 89], B [80, 84], B- [75, 79], C+ [70, 74], C [65, 69], D [55, 64], F [0, 54].

Your numerical course score (used in the grade curve above) = quiz scores + best three test scores + extra credit points; scores will be 'rounded' to the nearest whole number.

Make-up exams will be scheduled only in emergencies, as per university guidelines. A written permission is required: for example, if you were ill, we will need a letter from a doctor attesting to this fact. The letter should have the doctor's phone.

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you

what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>.

Academic Integrity Statement

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 is 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/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards 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. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Revised 9/2/2021