

MEC105 Spring Semester 2018
Online Course
Stony Brook University Department of Mechanical Engineering
College of Engineering and Applied Sciences
MEC 105: Everyday Science

This course satisfies the DEC category E

This course satisfies the SBC category SNW, Tech (proposed)

Course Instructor: Thomas Rosati Section: 01

OFFICE HOURS: The course is offered as a fully online course. “Office hours” will usually be done through online interaction (Email/Adobe Connect)

INSTRUCTOR CONTACT INFORMATION: Thomas.Rosati@stonybrook.edu

COURSE DESCRIPTION: 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 xerographic copiers, tape recorders, computers, microwaves, lasers, CDs, plastics, nuclear weapons, and magnetic resonance imaging (MRI) are developed by investigating how they work. The scientific method, engineering design methodology, safety, and environmental impacts are discussed in the context of these practical applications.

TOPICS:

- Basic Mechanics-The Laws of Motion and Mechanical Advantage
- Fluids, Pressure, and Thermodynamics
- Natural Forces- Light and Radiation
- Material Science- Elemental Science; Compounds and Polymers
- The Eye of Needle- Nanotechnology and Quantum Mechanics
- Human Science- You are what you Eat (and Drink)
- Fantastic Voyage -Cellular Mechanics and Gene Technology
- Improving and Extending Life Expectancy- Pharmacology and Human Repair
- Engineering Design- Evaluating the quality of a complex problem to be solved
- Mechanical Design- Complex Problem Solving Skills, Pugh Methodology for Engineering Design

Course Pre/co-requisites Satisfaction of entry skill in mathematics requirement (Skill 1) or satisfactory completion of DEC C or satisfactory completion of SBC QPS

COURSE LEARNING OBJECTIVES:

- Understand the methods scientists use to explore natural phenomena including observation, hypothesis development, measurement and data collection, experimentation, and evaluation of evidence. The scientific method will be learned in the context of the scientific principles enabling the many practical applications addresses in the course
- Understand the natural world and the major principles and concepts that form the basis of knowledge in the natural sciences. Specific principles include the laws of motion, fluid mechanics, heat transfer and thermodynamics
- Make informed decisions on contemporary issues involving scientific information and engineering design. Specific issues include public safety and environmental impacts.
- Demonstrate an ability to apply technical tools and knowledge to practical systems and problem solving. Tools include the physical laws of rigid-body motions, fluid behavior, and principals of thermodynamics and heat transfer applied to the operation of everyday mechanical devices. Students will develop the ability to identify and apply these analysis tools to common engineering designs.
- Design, understand, build, or analyze selected aspects of the human-made world. Students will understand the engineering design process as applied to various common everyday products

This course is approved to satisfy D.E.C. and/or the SBC, the objectives must address how the course outcomes relate to the specified D.E.C or SBC category.

Opportunities this course provides for students to acquire the knowledge or skills necessary to achieve the course learning outcome(s)

D.E.C. Competencies Basic Math Students will be required to use formulas and mathematic skills found in order to solve Engineering and Physics questions. Students will need to determine the proper formula or equation to use to solve a problem. Students will have minimal need to derive or use complex computation to arrive at a solution. Students will need to produce technical writing that is factual and annotated for origin. Students will also be asked to synthesize data and use subjective analysis based on specified data.

SBC Competencies Demonstrate Versatility Engage Global Issues (GLO) Address Problems using Critical Analysis and the Methods of the Humanities Master Quantitative Problem Solving Understand, Observe, and Analyze Human Behavior & the Structure and Functioning of Society Study the Natural World Understand Technology Explore Interconnectedness Examine significant relationships between Science or Technology and Social Sciences Pursue Deeper Understanding Experiential Learning Social and Behavioral Sciences Science, Technology, Engineering, and Mathematics Prepare for Life-Long Learning Practice and Respect Critical and Ethical Reasoning Evaluate and Synthesize Researched Information Write Effectively within One's Discipline

COURSE REQUIREMENTS: Text. **National Geographic- Science of Everything**
Published by **The National Geographic Society ISBN- 978-1-4262-1168-3**

GRADING: Based on a Midterm (10%) and a comprehensive final exam (15%). There will 7 class assignments (35%), a chapter review (5%) and one Engineering design project (20%).

There will be opportunities for earning extra credit for additional work. A: 100-92%, A-: 92-90%, B+: 89-87%, B: 86-84%, B-: 83-80%, C+: 79-75%, C: 75-70%, D: 69-65% and F: 65-0%

MEETING SCHEDULE The Class and all Exams are online through BLACKBOARD. There are no live class meetings for the course.

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, 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. <http://studentaffairs.stonybrook.edu/dss/index.shtml>.

Academic Integrity: 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.