MEC 262 Engineering Dynamics  
Spring 2016

Instructor:  Dr. Vivek Yadav  
Assistant Professor  
Department of Mechanical Engineering and Neurology (secondary)  
161 Light Engineering, Phone: 631-632-9164  
E-mail: vivek.yadav@stonybrook.edu

Lecture:  MoWeFr 11:00AM - 11:53AM at HARRIMAN HALL 137

Recitations:  
R01- Mo 4:00PM - 4:53PM, HARRIMAN HALL 104;  
R02- Mo 1:00PM - 1:53PM, EARTH & SPACE 131;  
R03- We 4:00PM - 4:53PM, HARRIMAN HALL 104.

TAs:  
Luke Alventosa  luke.alventosa@stonybrook.edu  
Shrinath Deshpande  shrinath.deshpande@stonybrook.edu

Office Hours:  
Dr Vivek Yadav: MoWe 2:00PM - 3:00PM, or by appointment.


Course Learning Objectives:
1. Represent and determine the velocity and acceleration vectors of a particle under Cartesian, polar as well as normal and tangential coordinate systems.
2. Use vector algebra to represent and analyze the velocity and acceleration components of a system of connected rigid bodies with pinned, sliding and rolling connections.
3. Demonstrate how to draw the free body diagrams of an object from a system of connected bodies.
4. Follow a vector based systematic procedure to kinetic analysis by applying the law of motion to relate forces obtained from free body diagrams and accelerations from kinematics to derive and solve the vectorial equations of motion for particles and rigid bodies in planar motion.
5. Understand the definitions of work, potential energy and kinetic energy.
6. Learn that work and energy principles may be more appropriate for solution when the internal forces are not a primary quantity of interest and to use these principles to obtain velocity, position and the work done by external forces.

Costanzo, Michael Plesha, McGraw-Hill.

**Grading:**
Homework assignments: 20% (Two lowest scores dropped)
Exam 1: 20%
Exam 2: 20%
Exam 3 (Final): 40%
Extra credits/Bonus: 5% (in-class quizzes, attendance, class participation, etc)

**Grading Scale:**
- 92 ≤ A ≤ 100
- 88 ≤ A- < 92
- 85 ≤ B+ < 88
- 81 ≤ B < 85
- 78 ≤ B- < 81
- 74 ≤ C+ < 78
- 70 ≤ C- < 74
- 67 ≤ C < 70
- 64 ≤ D+ < 67
- 60 ≤ D < 64

**Exams:**
All exams are closed book and closed notes. You may bring one 8.5×11 inch reference/cheat sheet with writing on the front and back.

**Homework:**
1. Homework will be assigned weekly and will be due in one week.
2. Late homework will not be accepted.
3. All homework assignments are individual, unless otherwise specified.
4. Homework problems should be neat, professional and well organized.
5. Homework will be accepted only during class, at the beginning of the lecture. Please put your HW on the professor’s desk before the lecture starts.

**Communication:**
I will be using online Blackboard system for managing contents and communication related to this class. You can access Blackboard at: [http://blackboard.stonybrook.edu](http://blackboard.stonybrook.edu). Use your NetID and password to log in. Your NetID is different from your Stony Brook ID number. If you are not familiar with Blackboard system or have a question related to it, see the Student Guide at [http://it.stonybrook.edu/services/blackboard/blackboard-students](http://it.stonybrook.edu/services/blackboard/blackboard-students).

**Fundamentals:**
From your pre-requisite classes, you should have acquired a working knowledge of
1. Basic Trigonometry (sines, cosines, basic trigonometry formula, etc.) and Geometry
2. Vector Calculus (differentiating and integrating vector functions) and Vector Algebra (adding two vectors, Dot and Cross products, etc.)
3. Free Body Diagram (FBD)
4. Differential and Integral Calculus

**Course Outlines:**
1. Introduction to Dynamics
2. Particle Kinematics
3. Force and Acceleration Methods for Particles
4. Energy Methods for Particles
5. Momentum Methods for Particles
6. Planar Rigid Body Kinematics
7. Newton-Euler Equations for Planar Rigid Body Motion
8. Energy and Momentum Methods for Rigid Bodies
9. Mechanical Vibrations
10. Three-Dimensional Dynamics of Rigid Bodies

Calculator Policy:
Effective Spring, 2009 only the following calculators will be permitted to be used on all midterm and final exams in the Department of Mechanical Engineering. There will be no exceptions. This list of calculators is identical to that allowed for the National Council for Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year as well as the Professional Engineering (PE) exam that you may take several years from now.

NCEES Allowed calculators as of Nov 2011:
- 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.
The NCEES policy on calculators can be found here: http://www.ncees.org/Exams/Examday_policies/Calculator_policy.php

Disability Support Services (DSS) statement:
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.

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:
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 Statement:**
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.