SPRING 2020

ENME664: DYNAMICS

Instructor: B. Balachandran, Professor of Mechanical Engineering
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Textbook: Greenwood, D. T., *Principles of Dynamics*, Prentice-Hall, Englewood Cliffs, NJ, 1988

References: Goldstein, H., *Classical Mechanics*, Addison-Wesley, Reading, MA, 1980
Neĭmark, J. I. and Fufaev, N. A., *Dynamics of Nonholonomic Systems*, AMS, 1972
Kane, T., *Analytical Elements of Mechanics: Vol. 2, Dynamics*, Academic Press, NY, 1961; available at copy center, 1123, Martin Hall

Time and Place: Tu, Th: 3:30 PM to 4.45 PM; EGR 3114

Office Hours: Tu, Th: 5:00 PM to 6.00 PM or by appointment

Grading: *Assignments*: 10%
Two Mid-Term Exams (In Class Exam, Date TBD & Take Home Exam, Date TBD,): 60%
Final Exam (Take Home Exam; Due Date: TBD): 30%.
All problems assigned may not be graded. Late homework will only be accepted under extenuating circumstances. It is okay to collaborate on assignments, but independent work is needed and essential to do well in exams.

Course Outline

1. Introduction and Overview (Chapter 1 of Greenwood, Chapter 1 of Kane)
2. Kinematics in Plane and Space (Chapter 2 of Greenwood, Chapter 2 of Kane)
3. Dynamics of a Particle in Plane and Space (Chapter 3 of Greenwood, Chapter 4 of Kane)
4. Dynamics of a Collection of Particles (Chapter 4 of Greenwood, Chapter 4 of Kane)
5. d'Alembert's Principle, Equations of Lagrange (Chapter 6, Greenwood), Virtual Power
6. Rigid Body Mechanics (Chapters 7 and 8 of Greenwood, Chapter 4 of Kane)
7. Stability

Comments

a) Course assignments, class notes for some of the lectures, and supplements will be posted at https://myelms.umd.edu
b) Software such as Matlab may be needed to carry out simulations.
c) Additional software may be introduced in the classroom