Spring Semester 2017

IN THE NAME ONE WHO TAUGHT THE MIND TO THINK

Department of Mechanical Engineering
Islamic Azad University-Tehran West Branch

COURSE TITLE: **Advanced Engineering Dynamics**

DAYS & TIME: Thursdays, 13:30 to 16:00
OFFICE HOURS: Tuesdays: 14:00-15:00, Tel: 6616-5541 (at Sharif Univ.)

INSTRUCTUR: Ali Meghdari, Ph.D., Professor, Email: meghdari@sharif.edu
http://sina.sharif.edu/~cedra/ecourse.php

TEXT BOOK: Advanced Engineering Dynamics, By: Jerry H. Ginsberg, Cambridge University Press, 2nd Ed., 1995, Electronic Version 2008, and Lecture Notes.

REFERENCES: Engineering Mechanics: Dynamics, By: J.L. Meriam & L.G. Kraige, John-Wiley & Sons, 4th Ed., 1998.
Advanced Dynamics; Modeling & Analysis, By: A.F. D'Souza & V.K. Garg, Prentice-Hall, 1984.
Dynamics, By: T.R. Kane & D.A. Levinson, McGraw-Hill, 1985.

TOPICS:

1. A Quick Review of Cartesian Tensors
2. Introduction, and Review of Undergraduate Dynamics
3. Kinematics: Coordinate Transformations, Curvilinear Coordinates, Generalized Coordinates, Euler's Angles, Moving Reference Frame, General 3-D Motion.
4. Particle Dynamics
5. Inertia Tensors
6. Rigid Body Dynamics: Eulerian Equations of Motion

Mid-Term Exam: **(1st week of Ordibehesht, 1396)**

7. Kinetic Principles in Non-Newtonian Reference Frame
8. Energy Principles: Leibniz Equations of Motion
9. Lagrange's Equations of Motion: (Constraints, Generalized Forces, Holonomic and Non-Holonomic Systems, etc.)
10. Hamilton's Principle
11. Introduction to Gyromechanics (if time permits)
12. Introduction to Kane's Equations of Motion (if time permits)

Final Examination: **(Finals Week, 1396)**

GRADING:

Homework	(15 % of the Final Grade)*
Quiz:	(15% of the Final Grade)
Mid-Term Exam:	(30% of the Final Grade)
Final Exam:	(40% of the Final Grade)

* Homework will be assigned every other session, and solutions will be posted online. Short quizzes will be given almost every week during the semester.