MCL 731 Analytical Dynamics

(3-0-0) 3 credits, B. slot (M-Th. 9:30 – 11:00 AM)

VI 404

Course Coordinator: S.K. Saha (II-419, x1135)

(Presently, II-264, x6139)

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Teaching Assistant: Mr. Saanka Sekhar Sinha

July 24, 2017 (M)[1]

Learning Objectives:

To be able to write dynamic equations of motion of a mechanical system using different modeling techniques.

Course Outline [28 classes]

1. Fundamental concepts: Vector products; Change of coordinates, and Coordinate Systems; Newtonian mechanics; General motion in 3-dimension; Rotation; Euler's equations
2. Lagrangian mechanics: Principle of "virtual work"; D'Alembert's principle; Hamilton's principle
3. Geometric theory and stability
4. Dynamics of deformable systems

Self-Learning (25-30% ≈12-13 hours)

1. Statics and dynamics of UG level
2. Linear algebra
3. Differential calculus

Books/Resource

1. Analytical Mechanics
   G.R. Fowles and G.L. Cassidey,
   Saunders college publishing
   1999
2. Classical Mechanics
   K. Sankara Rao
   Prentice Hall India, 2011

3. Introduction to Robotics (few topics)
   S.K. Saha
   McGraw Hill, 2nd Ed., 2014
4. Hand notes

Evaluation

Minor I: 20%
II: 20%
Major : 40%
Project: 15%
Quizzes: 5%

100%

Attendance Policies

Min. Requirement: 75% (Every 5% less, one grade less)
<50% (not allowed for major)
Min. Audit requirement: 75% attendance and 50% mark

Office hours

Will be announced as per requirement