UA 501- ADVANCED DYNAMICS

Course Code:	UA-501
UTAA Credit (Theoretical-Laboratory hours/week):	3(3-0)
ECTS Credit:	6.0
Department:	Unmanned and Autonomous System Engineering
Language of Instruction:	English
Level of Study:	Graduate
Offered Semester:	Fall and Spring Semesters.

Course Objectives

To give the students a sense for movement of the objects. To solve forces and moments and their effects, and interpret consequences on objects. To learn analysis techniques for mechanic systems. To interpret the results in terms of physical quantities

Course Content

Fundamentals of Kinematics. Coordinate Frame and Position Vector. Fundamentals of Dynamics. Laws of Motion, Equation of Motion. Force and Moment. Motion Kinematics, Velocity and Acceleration kinematics. Rotation Kinematics. Rigid Body, Elements of the Mass Moment Matrix. Rotation Dynamics, Rigid body rotational Cartesian dynamics. Rigid-Body Rotational Eulerian Dynamics. Homogeneity and Isotropy, Describing Space. Constraints types, Constraint Force, Virtual and Actual Works Lagrange Form of Newton Equations. Lagrange Equation and Potential Force.

Course Learning Outcomes

1-To be able to use convenient mechanics approach such as Newton or Lagrange

2-Gain the ability to write kinematical and dynamical or energy equations to analyses mechanical systems.

3-To be able to develop problem oriented solution procedure

4-To manage free body diagrams with related constraints

5-Solve the system with related initial and boundary conditions,

6-To give reasonable comments on the results and the compatibility of the results with the