

**Department: Aerospace Engineering**  
**Level and Major: Graduate**

**Division: Flight Mechanics**

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**Course Title: Modeling of Aerospace Vehicle Dynamics**

**Number of Credits: 3**

**Prerequisite : -**

**Lecturer: Kamran Raissi**

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**Course Description:**

Modeling of aircraft dynamics and the subsystems including aerodynamics, propulsion, and avionics. Use tensors for modeling and solving dynamic problems.

**Course Goals and Objectives:**

Gaining the knowledge of modeling of dynamics system.

**Course Topics**

- General perspective
- Classical mechanics
- Tensor elements
- Frame and coordinate systems
- Rotation tensor
- Kinematics of changing times
- Attitude determination
- Linear momentum
- Newtonian dynamics
- Transformations
- Inertia tensor
- Angular momentum
- Euler law
- Gyro dynamics

**The course aims to:**

Ability to model system and subsystems in form of tensors

**Reading Resources:**

- P. Zipfel, "Modeling and Simulation of Aerospace Vehicle Dynamics", AIAA Education Series, 2000.

**Evaluation:**

Homework  
Midterm Exam  
Project  
Final exam