## Aerospace Engineering

**Course Title: Inertial and Satellite Navigation** **Number of Credits: 3**

## Course Topics:

- Introduction to navigation systems,sensors,displays
- Inertial Sensors (Accelerometers, Gyroscopes, Sensor specifications)
- Mechanization Equations (Coordinate Systems, DCM and Quaternions, Computations and Error analysis)
- Inertial Navigation Systems (Gimballed platforms, AHRS, Strapdown, Calibration and Alignment)
- Overview of GNSS (Ground, Space and User segments)
  - GPS Positioning Principles (Signal structure, Position and Attitude Determination Algorithms, Error analysis)
- GNSS Augmentation (Aviation based and Space based augmentation)
  - GNSS Aviation Applications (Positioning, Navigation, Landing, Time, Differential, Test range)
- Sensors and Data Fusion (Aircraft sensors, Random signals, Noise, Error analysis, Kalman Filter)
- Automatic Dependent Surveillance – Broadcast
- RNAV,VNAV,WAAS navigation system

## Reading Resources:


- Titterton D, Weston JL, Weston J. “Strapdown inertial navigation technology.” IET; 2004.
- Britting, Kenneth R. “Inertial navigation systems analysis.” 1971.
- Groves, P. “Principles of GNSS, Inertial, and Multisensor Integrated Navigation Systems.” Artech, 2013.
- George Petropoulos, Prashant S. **“**GPS and GNSS Technology in Geosciences**.”** Elsevier, 2021.