OCE2901 Lesson Plan - 03/20/23

**Lesson Plan 1: IMU Time Series Processing**

*Total Time: 50 Minutes*

1. Preface (5 minutes)
   1. Timeline for next two weeks
   2. Check in with Group 2 on when they are deploying this week
   3. Any questions about previous content or deployments
2. Introduction to sensors: accelerometers, gyroscopes, and magnetometers (10-15 minutes)
   1. Overview of how the sensors work
   2. Sources of potential errors (bias, drift, offset)
   3. How to calibrate each sensor
3. Processing IMU time series data (20-25 minutes)
   1. Overall process
   2. Record IMU data
      1. Give block diagram of capturing IMU data (RE: Thetis firmware)
   3. Pre-processing IMU time series
      1. Filtering techniques
         1. Review High-, low-, band-pass filters
         2. Introduce Kalman filter
      2. Normalization (definition)
      3. Decimation (definition)
   4. Extracting features
      1. Windowing (integrate timestamps from wave analysis)
      2. Spectral analysis
   5. Analyze (quick discussion)
4. Demonstration (5-15 minutes)