Leon H. Charney School of Marine Sciences
UNIVERSITY OF HAIFA

Inertial Sensing and Navigation- 229.4008

Instructor: Prof. Itzik Klein kitzik@univ.haifa.ac.il

Course description: A graduate-level course on inertial navigation system (INS) theory and applications. Inertial sensors technologies and error models. Reference and coordinate frames. Navigation equations of motion and simplified error models.

Syllabus:

Part I - Introduction

- The art of navigation

Part II - Inertial Sensors

- Inertial measurement unit
- Inertial sensor error models
- Sensor calibration

Part III - Navigation Mathematics

- Reference and coordinate frames
- Frame transformations
- Quaternions

Part IV - Navigation Systems

- Navigation equations of motion
- Coarse alignment and initialization
- Simplified error models

Textbooks:

- P. D. Groves, Principles of GNSS, inertial and multisensor integrated navigation systems, Artech House, 2013.
- Titterton D. H. and Weston J. L., Strapdown inertial navigation technology – second edition, The American institute of aeronautics and astronautics and the institution of electrical engineers, 2004

Grading policy:

Participation: 10%

Final project: 90%