Communications Laboratory

ECE 5007

Credit Hours:
0.50

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lab

Course Description:
A laboratory in digital data communication implementing a software-defined modem: quadrature modulation; phase-shift keyed modulation; inter-symbol interference; timing and frequency recovery.

Prerequisites and Co-requisites:
Prereq or concur: 5000 (501), and enrollment in ECE or EngPhysics major; or Grad standing in ECE.

Course Goals / Objectives:
• Master concepts of sampling, aliasing, filtering, and quadrature modulation through implementation of software-defined modulation and demodulation.
• Master signal space representation of digital modulation for phase-shift keying.
• Be competent with timing and frequency recovery as examples of combating channel impairments.
• Students should advance to competency their skills in creating structured software, debugging, and experimentation.
• Students should demonstrate design competence via integration of processing steps to arrive at a working packet-based acoustic digital modem.
Course Topics:
- Introduction: signals and systems
- Quadrature modulation
- Digital modulation
- Pulse shaping and inter-symbol interference
- Synchronization
- Frequency recovery
- Acoustic modem demonstration

Designation:
Elective