

ELEC 4600
Radar and Navigation

Course Grading

The breakdown for the grades will be as follows:

Two term quizzes @ 20%	40%
Final Exam	60%

Reference Text

M. Skolnik, Introduction to Radar Systems, McGraw Hill

M. Kayton & W.R. Fried, Avionics Navigation Systems, Wiley

Course Outline

Week

Section I: Radar Fundamentals

1. Radar Block Diagrams, Operation, Applications, Radar Equation
2. Minimum Detectable Signal, SNR, Integration of Radar Pulses
3. Cross Section Fluctuations, Pulse Repetition Frequency
4. Range Ambiguities, Antenna Parameters, System Losses

Section II: MTI Surveillance Radar

5. Introduction, Delay Line Cancellers, Multiple or Staggered PRF
6. Digital Signal Processing, Example of an MTI Processor
7. Limitations of MTI Performance, Tracking with Surveillance Radars

Section III: Radio Navigation

8. Definitions, Lines of Position, Relative Navigation Systems - NDB/ADF, VOR, DVOR
9. DME, TACAN, Absolute Navigation Systems – Loran C, Multi DME

Section IV: GPS

10. Space Segment, Satellite Position Determination, Signal Format
11. GDOP, Receivers and Signal Processing, GPS Errors

Section V: Navigation Equations

12. Geometry of the Earth, Co-ordinate Frames, Dead Reckoning Computation
Radio Computations, Most Probable Position Course Computation, Position Errors