

**I. COURSE INFORMATION:**

- A. Division: Technical  
Department: Electricity/Electronics  
Course ID: ELECTR 257B  
Course Title: Navigation & Communication Systems  
Units: 4  
Lecture: 3 hours  
Laboratory: 3 hours  
Prerequisite: ELECTR 250B  
Corequisite: None  
Dept. Advisory: None
- B. Catalog Description: Bench test, installation and ramp test of transmitter and receiver systems and their operating principles. Systems include Auto Direction Finder, Very High Frequency Omnidirectional Range, LORAN-C, Omega, INS, DME, ILS, VHF communication, HF communication, FM transceivers and transponder.
- C. Schedule Description: Bench test, installation and ramp test of transmitter and receiver systems and their operating principles.

**II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One**

**III. EXPECTED OUTCOMES:**

- Upon successful completion of the course, the student should be able to:
- A. Explain, read and interpret aircraft electrical schematics for troubleshooting purposes.
  - B. Inspect, check, and repair basic avionics systems and components.
  - C. Evaluate, operate, and maintain basic aircraft avionics components.
  - D. Describe, check, and modify navigation and communication systems and components.
  - E. Operate and maintain navigation and communication systems and components.
  - F. Discuss, check, and maintain aircraft antenna systems.
  - G. Install and operational check aircraft communication and navigation systems.

**IV. COURSE CONTENT:**

- A. Introduction/publications
  - 1. Part 97
  - 2. NTSB
- B. Instruments
  - 1. Digital instruments
  - 2. Vertical tape instruments
  - 3. Analog dial-type instruments
  - 4. Instrument systems
    - a) Altimeter system
    - b) Airspeed system
    - c) Compass system
    - d) Turn and slip indicators
    - e) Gyroscope system
- C. Electrical power
  - 1. Power distribution systems
  - 2. Generator systems
  - 3. Constant speed drives
- D. Lights
  - 1. Warning system
  - 2. Annunciator lights

3. Navigation lights
4. Landing lights
- E. Maintenance and operational check of antenna systems
  1. ADF antenna
  2. VHF antenna
  3. UHF antenna
  4. HF antenna
- F. Auxiliary power
  1. Generator
  2. Distribution system
- G. Communication
  1. 1FF system
  2. ADF system
  3. VHF communication system
  4. UHF communication system
  5. HF communication system
- H. Navigation
  1. VOR system
  2. ILS system
  3. Glideslope system
  4. OMEGA
  5. Marker beacon system

**V. METHODS OF INSTRUCTION: (Please check all that apply and add any additional not listed.)**

- Lecture
- Class and/or small group discussion
- Critical evaluation of texts, newspapers, journal articles, and other printed research
- Critical evaluation of films, videotapes, audiotapes, or other media forms
- Classroom demonstrations
- Field trips
- Guest speakers
- Other: Practical lab exercises with radio and NAV-AID equipment
- Other:
- Other:

**VI. TYPICAL OUT-OF-CLASS ASSIGNMENTS:**

- A. Reading Assignment. Reading assignments are required and may include (but are not limited to) the following: After reading the chapter on Lights, discuss in small groups the warning system.
- B. Writing Assignment. Writing assignments are required and may include (but are not limited to) the following: Written homework assigned each week from the questions and problems in each chapter.  
Typical Question: Describe navigation and communication systems and components.
- C. Critical Thinking Assignment. Critical thinking assignments are required and may include (but are not limited to) the following: Install and operational check aircraft communication and navigation systems.

**VII. EVALUATION:**

A student's grade will be based on multiple measures of performance and will reflect the objectives explained above. A final grade of "C" or better should indicate that the student

has the ability to successfully apply the principles and techniques taught in this course. These evaluation methods may include, but are not limited to, the following (Please check all that apply, and add additional ones not listed):

- Portfolios
- Projects
- Written papers or reports
- Presentations (oral and visual)
- Work performance (internships or field work)
- Lab work
- Comprehensive examinations (cumulative finals or certifications)
- Peer evaluation
- Self evaluation
- Classroom participation
- Homework
- Other:
- Other:
- Other:

**VIII. TYPICAL TEXTS:**

- A. Shrader, R. L., Electronic Communication, 6<sup>th</sup> Edition, Glencoe, New York, 2000
- B. West, Gordon, GROL PLUS, 2<sup>nd</sup> Edition, Master Publishing, Illinois, 2001
- C. Wasson, James W., Avionics Systems, Operation and Maintenance, Jeppesen Sanderson Training Products, Illinois, 2000

**IX. OTHER SUPPLIES REQUIRED OF STUDENTS:**

Scientific calculator

**PREREQUISITE/COREQUISITE/ADVISORY  
 COURSE GRID FORM**

**Target Course:** ELECTR 257B Navigation & Communication Systems

**Prerequisite Course:** ELECTR 250B Radio Transmitters, Receivers and Antennas

**Instructions:**

- 1) List exit competencies (skills) from Prerequisite Course. These skills are listed in the "Student Outcomes" section of the Course Outline ("upon completion of the course, the student should be able to...")
- 2) Indicate which of the listed exit competencies (skills) are necessary entry skills needed for success in the target course. Mark with an "X" each needed skill.
- 3) Indicate the degree of importance of each needed entry skill for course success, using the following rating scale:

1=Critical      2=Very Helpful      3=Desirable

**Skills Analysis**

Entry Skills in Target Course	Exit Skills Provided by Prerequisite Course (Mark with an X if needed and indicate Prerequisite Course if more than one).	Degree of Importance (Rate 1 – 3)
1. Explain the fundamental operation of AM and FM transmitters and receivers.	X	1
2. Outline the major components of an AM and FM transmitters and receivers.	X	1
3. Describe the operation of oscillators and their application in modulator and demodulator circuits.	X	1
4. Define the concept of modulation and demodulation and compare AM, FM, phase, pulse and digital.	X	1
5. Discuss the design and operation of antennas and their relation to radio wave propagation.	X	1