

METROPOLITAN STATE UNIVERSITY OF DENVER  
Office of Academic and Student Affairs

**REGULAR COURSE SYLLABUS**

College of: Professional Studies

Department: Engineering and Engineering Technology

Prefix & Course Number: CPE 4620 Crosslisted With\*: \_\_\_\_\_

Course Title: Advanced Communication Systems

Transcript Course Title (30 characters): Advanced Communication Sys

Check All That Apply: Required for Major: \_\_\_ Required for Minor: \_\_\_\_\_ Specified Elective: X  
Required for Concentration: \_\_\_\_\_ Elective: \_\_\_\_\_ Service Course: \_\_\_\_\_

To receive Title IV financial aid funds, all institutions of higher education must comply with the federal definition of a credit hour. The Higher Learning Commission requires institutions to maintain policies and procedures for verifying compliance with this definition.

**Federal Credit Hour Definition:** A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than:  
(1) one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or (2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward to the award of credit hours. 34CFR 600.2 (11/1/2010)

Credit Hours: 3 (3+0) Schedule Type: L Grade Mode: L

**Face-to-Face or Equivalent Hours per course:**

Lecture 45 Lab \_\_\_ Internship \_\_\_\_\_ Practicum \_\_\_\_\_ Other (please specify type and hours): \_\_\_\_\_

Additional Student Work Hours per course: 90

Variable topics umbrella course: No X Yes \_\_\_\_\_ If yes, number of credits/repeats allowed \_\_\_\_\_

Specified repeatable course: No X Yes \_\_\_\_\_ If yes, number of credits/repeats allowed \_\_\_\_\_

Prerequisite(s): CPE 3620 (with a grade of "C" or better for all prerequisites)

Corequisite(s): \_\_\_\_\_

Prerequisite(s) or Corequisite(s): \_\_\_\_\_

APPROVED:

\_\_\_\_\_  
Department Chair OR Program Director Date

\_\_\_\_\_  
Dean OR Associate Dean Date

\_\_\_\_\_  
Associate VP, Academic and Student Affairs Date

\*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number:

**Banner Enforced Coding:**

**Prerequisite(s):** CPE 3620 (with a grade of "C" or better for all prerequisites)

**Corequisite(s):** \_\_\_\_\_

**Prerequisite(s) or Corequisite(s):** \_\_\_\_\_

**Registration restrictions:** Level \_\_\_\_\_ Class \_\_\_\_\_ Program/Major \_\_\_\_\_ Student attribute \_\_\_\_\_

**Catalog Course Description:**

This is a senior research course which requires student analysis of HF, VHF, UHF, microwave, spread spectrum, optical, video, and satellite systems. Analog and digital cellular and personal communications services, including AMPS, GSM, CDMA, wireless LAN microwave satellite communications systems will be examined.

**Specific Variable Topics Course Description (if applicable, umbrella course description included above):**

**Required Reading and Other Materials will be equivalent to:**

No text is identified since students will be required to search appropriate sources for information.

**Specific, Measurable Student Behavioral Learning Objectives:**

Upon completion of this course the student should be able to:

1. Analyze and design HF, VHF, UHF, and microwave systems
2. Analyze spread spectrum systems
3. Analyze optical, video, and satellite communication systems
4. Evaluate digital cellular and PCS communications system performance
5. Solve wireless transmission problems including quantization of system, performance such as bit error rate, processing gain, bandwidth utilization, link budgets path loss, minimum system requirements, probability of coverage
6. Analyze the main wireless technology standards of current and future wireless communications systems.
7. Solve satellite orbital mechanics problems
8. Solve power problems relating to various satellite configurations
9. Compute path dispersion losses, noise figure, dynamic range, signal to noise ratios, C/N, GIT, and other system performance criteria
10. Compute earth station antenna azimuth and elevation angles and be able to determine satellite visibility

**Detailed Outline of Course Content (Major Topics and Subtopics) or Outline of Field Experience/Internship (experience, responsibilities and supervision):**

- I. Operational wireless systems introduction
  - A. Modes of wireless communication
    1. Mobile radio propagation concepts
    2. HF, VHF, UHF, and microwave
    3. Free-space optical propagation
    4. Other modes
  - B. Wireless networks and services
  - C. Applications
- II. Fundamentals of wireless system design
  - A. Video, voice and data communication services
  - B. Spread spectrum systems
  - C. Modulation techniques for cellular and PCS systems
  - D. Access techniques for wireless packet data networks
  - E. Spacecraft subsystems

1. Satellite orbital aspects
2. Current and future satellite services
3. Satellite communications systems design
4. Propagation issues in satellite communications

F. Laser and fiber optic transport systems

III. Current and emerging wireless system standards

**Evaluation of Student Performance:**

1. Written Assignments
2. Presentations