SPST613

Course Summary

Course : SPST613 **Title :** Satellite Communications **Length of Course :** 8 **Faculty :**
Prerequisites : SPST500, SPST501 **Credit Hours :** 3

Description

Course Description:

CORE COURSE: This course is a study of the principles, architectures, technologies, management, economies, advantages, and disadvantages of satellite communications. Spacecraft launch vehicles, orbits, communications modulations, radio wave propagation, payload designs/types, and spacecraft bus and antenna types are all addressed. Students will learn to devise/formulate actual satellite communications link budgets and evaluate the impact of each variable used within the equation. IT IS HIGHLY RECOMMENDED THAT YOU HAVE PREVIOUSLY COMPLETED COLLEGE ALGEBRA BEFORE TAKING THIS COURSE. (Prerequisites: SPST500 and SPST501) **Course Scope:**

At the end of this course, you will have a firm understanding of the key factors involved in satellite communications, from both ground and space segment perspectives.

Objectives

Upon completion of this 8-week course, the student will be able to:

CO-1: Describe the roles, responsibilities, and functions of the ITU and INTELSAT
CO-2: Describe the function and characteristics of selected communications satellites
CO-3: Describe satellite orbital terms and elements
CO-4: Derive orbital parameters from 2-line element sets
CO-5: Describe terms associated with geostationary satellites
CO-6: Predict SATCOM link values based on radio wave propagation and atmospheric impairments
CO-7: Describe the polarization of radio waves
CO-8: Derive SATCOM link values based on antenna theory
CO-9: Describe the systems and subsystems which comprise SATCOM space segments
CO-10: Describe the systems and subsystems which comprise SATCOM Earth segments
CO-11: Describe terms analog and digital signals
CO-12: Calculate parameters associated with analog and digital signals
CO-13: Compare analog and digital communications signals

- CO-14: Describe the parameters associated with error control coding
- CO-15: Derive space link parameters through the use of link-power budget calculations
- CO-16: Describe the modes of interference that can occur in a SATCOM system
- CO-17: Describe the various modes of operation to allow satellite access
- CO-18: Describe the defining features of a broadband network
- CO-19: Describe parameters associated with Direct Broadcast Satellites
- CO-20: Describe the advantages and disadvantages of various satellite mobile and specialized services
- CO-21: Develop a comprehensive research paper on a communications satellite

Outline

Week 1: Overview of Satellite Systems, Orbits & Launching Methods, and the Geostationary Orbit

Course Objective(s)

1-5

Readings

Roddy, Chapters 1-3

Assignment(s)

Discussion Post #1
(Due end of Week 1)

Week 2: Radio Wave Propogation, Polarization, and Antennas

Course Objective(s)

6-8

Readings

Roddy, Chapters 4-6

Assignment(s)

Discussion Post #2

(Due end of Week 2)

Homework #1 (Due end of Week 2)

Week 3: The Space and Earth Segments

Course Objective(s)

9-10

Readings

Roddy, Chapters 7-8

Assignment(s)

Homework #2

(Due end of Week 3)

Short Paper Assignment (Due end of Week 3)

Week 4: Analog/Digital Signals and Error Control Coding

Course Objective(s)

11-14

Readings

Roddy, Chapters 9-11

Assignment(s)

Discussion Post #3

(Due end of Week 4)

Homework #3 (Due end of Week 4)

Week 5: The Space Link and Interference

Course Objective(s)

15-16

Readings

Roddy, Chapters 12-13

Assignment(s)

Discussion Post #4
(Due end of Week 5)

Homework #4 (Due end of Week 5)

Week 6: Satellite Access and Satellites in Networks

Course Objective(s)

17-18

Readings

Roddy, Chapters 14-15

Assignment(s)

Discussion Post #5

(Due end of Week 6)

Homework #5 (Due end of Week 6)

Week 7: Direct Broadcast Satellite Television, Satellite Mobile and Specialized Services

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Course Objective(s)

19-20

Readings

Roddy, Chapters 16-17

Assignment(s)

Homework #6 (Due end of Week 7)

Week 8: Satellite Communications Research

Course Objective(s)

1-21

Readings

Review Previously Read Material

Assignment(s)

Research Paper Assignment (Due end of Week 8)

Evaluation

Grades for this course will be based on five grading instruments. You must complete all assigned tasks in order to pass the course.

Homework Assignments

The homework assignments make up 30% of your overall course grade. Details for each homework assignment can be found in the assignments section. All work must be shown in order to obtain full credit for each question.

Short Paper

This assignment is worth 14% of your course grade. Details can be found in the assignments area. The 4-5 page paper will be due at the end of Week 3. Your paper must be at least 4 pages of written material; you can use illustrations, graphs, charts, etc. but the written portion of your

paper must be at least 4 pages. APA style must be used and be sure to cite ALL facts/sources as you use them!

Research Paper

This assignment is worth 30% of your course grade. Details on the research paper are posted in the assignments area. The 14-16 page paper will be due at the end of Week 8. Your paper must be at least 14 pages of written material. You can use illustrations, graphs, charts, etc. APA style must be used and be sure to cite ALL facts/sources as you use them!

Discussion Postings

Discussions are worth 26% of your course grade. Eight times throughout the course, discussion items will be posted within the Discussion area of the classroom. Your responses must be well written and grammatically correct. Your responses will clearly show whether you have read assigned classroom readings (listed in this syllabus). ***You must also comment on at least two other student's postings and ask your classmates at least two relevant questions during the week.***

All assignments in this course are given to you prior to the due date. The "due date" for all assignments is the week in which the assignment is due. For the purposes of this course, a "**week**" is defined as the time period between Monday–Sunday. The **first week** begins on the first day of the semester and ends at 11:59 PM EST the following **Sunday**.

Grading:

Name	Grade %
Discussions	26.00 %
Week 1: Introduce Yourself	3.25 %
Week 2: Free Use of Space	3.25 %
Week 3: Satellite System Design	3.25 %
Week 4: Act of War?	3.25 %
Week 5: Weaponizing Space	3.25 %
Week 6: Radio vs. Optical Educational Goals	3.25 %
Week 7: Satellite Comparisons	3.25 %
Week 8: Research Paper Final Thoughts	3.25 %
Research Paper	30.00 %
Research Paper (Due end of week 8)	30.00 %
Short Paper	14.00 %
Short Paper (Due end of Week 3)	14.00 %
Homework	30.00 %
Homework #1 (Due end of Week 2)	5.00 %
Homework #2 (Due end of Week 3)	5.00 %
Homework #3 (Due end of Week 4)	5.00 %

Homework #4 (Due end of Week 5)5.00 %
Homework #5 (Due end of Week 6)5.00 %
Homework #6 (Due end of Week 7)5.00 %

Materials

Book Title: Satellite Communications, 4th edition

Author: Dennis Roddy

Publication Info: McGraw-Hill

ISBN: 9780071462983

Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- Tutor.com offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Assignments

- The University encourages all work to be completed according to the course schedule. The University Late Work Policy can be found in the Student Handbook here.

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Turn It In

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services

  such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Discussion

- Discussions are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the discussion. The purpose of the discussions is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

Identity Verification & Live Proctoring

- Faculty may require students to provide proof of identity when submitting assignments or completing assessments in this course. Verification may be in the form of a photograph and/or video of the student’s face together with a valid photo ID, depending on the assignment format.
- Faculty may require live proctoring when completing assessments in this course. Proctoring may include identity verification and continuous monitoring of the student by webcam and microphone during testing.

University Policies

Student Handbook

- Drop/Withdrawal policy
- Extension Requests
- Academic Probation
- Appeals
- Disability Accommodations

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation’s military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.