

Course Description Summary

Course number: ECE 478	Course name: Satellite Communications Systems
لغة تدريس المقرر: English	Pre-requisites: ECE 371, ECE 220
Credit hours: 3 (3+0+0)	Course level: Elective

Course Description

وصف المقرر :

The course is intending to cover the fundamental concepts of satellite communications and orbital concepts. The student is expected to understand the basics of satellite communications, satellite system elements, key issues of satellite, handle error control for digital satellites, and grasp the propagation effects on satellite-earth links.

Course Outcome

مخرجات التعليم:

Upon completing the course, the student should be able to:

1. Describing satellite orbit
2. Explain Kepler's three laws
3. Compute orbital Period
4. Classify different orbital elements
5. Recognizing coordination elevation and azimuth angles
6. Describing orbital size, shape, orientation, and satellite location
7. Compare the role of different subsatellite systems
8. Compare between different transponders
9. Solve problems on antenna gain and diameters
10. Design link budget for satellite uplink/downlink
11. Differentiate between different frequency bands used by satellite
12. Differentiate between satellites in different altitudes
13. Recalling basic transmission theory
14. Classify different propagation effects (gases, rain, ionosphere, scintillations)
15. Compare between rain types
16. Compute rain attenuation
17. Recognize contour maps for rain rate
18. Explain digital transmission
19. Describe QPSK modulation technique
20. Recognize different multiple access techniques
21. Stating errors occurred and solutions
22. Classify different satellite applications

المواضيع

Topics

- Introduction to satellite - communications and its applications
- Satellite systems elements
- Satellite signal coding
- Satellite link design
- Orbits and launching methods
- Beam angle and directivity
- Altitude control
- Frequency distribution

- Radiation Pattern
- Error control for digital satellite
- Modulation and Multiplexing techniques
- Multiple access
- Propagation effects and their impact on satellite-earth link
- Exploration of some applications of satellite systems (GPS, Mobile communication, WEB communications)

Textbook and references

الكتاب المقرر والمراجع المساندة:

“Timothy Pratt, Charles W. Bostian, Jeremy E. Allnutt, “Satellite Communication Systems”, John Wiley & Sons, The Latest Edition