ELCT 562 - Wireless Communications

CREDITS/CONTACT HOURS: Credits: 3, Contact Hours: 28

COORDINATOR: Dr. Mohammad Ali

TEXTBOOK:


SUPPLEMENTAL MATERIALS:


CATALOG DATA:

Prerequisite: ELCT 332, ELCT 361. Two lectures per week each 75 minutes.

USC Bulletin Description: Second and third generation wireless networks, wireless local area networks (WLANs), Bluetooth, cellular concepts, mobile radio propagation, modulation techniques, multiple access techniques, wireless networking, wireless systems and standards. Restricted to graduate students and senior undergraduate students.

REQUIRED/ELECTIVE:

Elective

TOPICS COVERED:

- Introduction to wireless systems, cellular, GPS, satellite, WLAN, Bluetooth, RFID, radar etc. (3 hrs)
- Introduction to wireless system chain, transmitter and receivers, noise, noise figure, dynamic range, noise temperature, intermodulation products (8 hrs)
- Path loss calculation techniques and Modulation (3.5 hrs)
- Wireless hardware basics - antennas, amplifiers, mixers, filters, baluns etc. (12 hrs)
- Some laboratory demonstration of measurement equipment – vector network analyzer, power meter, spectrum analyzer etc. (1.5 hrs)

COURSE OUTCOMES:

The student will:

1. Demonstrate competency in understanding the terms, symbols, and units used in wireless system design, such as TDMA, EIRP, mixer etc. (a)
2. Show ability in understanding issues with path loss, fading, Doppler shift, modulation, and interference (a, e, g, k)
3. Show ability to understand and design some wireless system hardware, such as filters, mixers, switching circuits, amplifiers, and baluns (a, e, c, g, k).
4. Demonstrate fundamental competency to design and analyze basic antenna elements for wireless devices and base stations (a, e)

Relation of course outcomes to program outcomes

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<tr>
<th>Program Outcomes</th>
<th>Course Outcomes</th>
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<tbody>
<tr>
<td>An ability to apply knowledge of math, science and eng. (a)</td>
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<td>An ability to identify, formulate, and solve engineering problems (e)</td>
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<td>Ability to communicate effectively (g)</td>
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<tr>
<td>Ability to use the techniques, skills and modern engineering tools necessary for engineering practice (k)</td>
<td>H M M</td>
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<tr>
<td>Ability to use the techniques, skills and modern engineering tools necessary for engineering practice (c)</td>
<td>H M</td>
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ASSESSMENT METHODS:
1. Homeworks.
2. Written tests.
3. Project reports and presentations.