

Brief Course Description

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| Course number: ECE 421 | Course name: Antenna Theory and Design |
| لغة تدريس المقرر: English | Pre-requisites: ECE 220 |
| Credit hours: 4 (3+ 2 + 0) | Course level: Elective-Fifth Year |

Course Description

وصف المقرر :

Review of Maxwell's equations and antenna basics. Radiation patterns and Friis equation. Radiation integrals. Linear wire antennas. Antenna arrays. Synthesis of far field patterns by array factors. Broadband antennas and matching techniques. Microstrip antennas. Introduction to antennas in wireless systems. Methods of antenna measurements. Antenna design using commercial software.

Course objectives

أهداف المقرر :

- ✓ To introduce the fundamentals of antenna theory and the standard antenna parameters.
- ✓ To explain simple antennas such as dipole, monopole, loop, traveling-wave antennas as well as microstrip antennas, and antenna arrays.
- ✓ To explain the self and mutual impedance of linear elements and arrays.
- ✓ Acquire the analytical and software skills for antenna design and analysis.

Course Outcomes

مخرجات التعليم:

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

- Understand of antenna fundamentals and far field radiation.
- Design different types of antenna arrays with required radiation pattern and performance in communication systems.
- Understand self and mutual impedance and the basics of numerical analysis for antennas.
- Carry out antenna design and analysis using standard simulation software.

Textbook and references

الكتاب المقرر والمراجع المساندة:

| Book | Authors | Publisher | Publication year |
|--|--|---------------|------------------|
| Antenna Theory: Analysis and Design (textbook) | Constantine A. Balanis | John Wiley | 2016 |
| Antenna Theory and Design | Warren L. Stutzman, and Gary A. Thiele | John Wiley | 2012 |
| Antenna Theory and Design | R. S. Elliott | Prentice Hall | 2003 |