

COURSE	Name	: Multi Antenna Communication Systems
	Code	: EE185533
	Credit(s)	: 2
	Semester	: (Elective Course)

Description of Course

The course of the Multi Antenna Communication Systems discusses communication systems that utilize plural antennas both in the form of adaptive arrays and in MIMO configurations.

Learning Outcomes

Knowledge

(P01) Mastering the concepts and principles of science in a comprehensive manner, and to develop procedures and strategies needed for the analysis and design of systems related to the field of power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics as a preparation for further education or professional career.

Specific Skill

(KK01) Being able to formulate engineering problems with new ideas for the development of technology in power systems, control systems, multimedia telecommunications, electronics, intelligent multimedia network, or telematics.

General Skill

(KU05) Being able to take decisions in the context of solving problems of science and technology development that concerns and implements the humanities value based on analytical or experimental studies of information and data.

Attitude

(S09) Demonstrating attitude of responsibility on work in his/her field of expertise independently.

Course Learning Outcomes

Knowledge

Mastering the concept of communication systems with adaptive array antennas and MIMO communication systems.

Specific Skill

Able to analyze communication systems with array antennas and MIMO communication systems.

General Skill

Able to evaluate communication systems with antenna arrays and MIMO communication systems with software (Matlab).

Attitude

Able to show a responsible attitude in developing knowledge in the field of communication systems with multi antennas.

Main Subjects

1. Model of Low-pass system and digital communication signals and digital communication system performance on AWGN channel
2. Modeling fading canal responses
3. Digital communication system performance on the slow Rayleigh fading frequency-flat channel
4. Diversity in reciever (MRC)
5. Diversity in transmitter (Alamouti Method and STBC)
6. SVD analysis and theoretical capacity of MIMO channels
7. Spatial multiplex (BLAST)
8. Spatial multiplex on frequency-selective MIMO channels
9. Cooperative communication system
10. Phased array and array antenna synthesis
11. Technique of detecting the direction of arrival of a signal
12. Adaptive array antenna technique
13. Multiple communication system performance with adaptive array antenna

Reference(s)

- [1] John Proakis, Masoud Salehi, Digital Communications, McGraw-Hill, 2005.
- [2] David Tse, Pramod Viswanath, Fundamentals of Wireless Communications, Cambridge University, 2005.
- [3] Constantine Balanis, Antenna Theory Analysis and Design, ed. 3, Wiley-Interscience, 2005.
- [4] Frank Gross, Smart Antennas with Matlab, McGraw-Hill, 2015.
- [5] Nathan Blaunstein, Christos Christodoulou, Radio Propagation and Adaptive Antennas for Wireless Communication Networks, Wiley, 2014.

Prerequisite(s)

- Propagation and Radiation
- Digital Communication Systems