Mobile Communication Systems

Course Name	Course type (credit/hours)	Elective course(3/3)	Course code	C043
	Target students Division/major/grade	Electrical and Computer Engineering/Senior	Opening semester	2020 1ST SEMESTER
	Class time and classroom	Mon B(WH539)Thu B(WH539)	English Grade	A(100%English)
Reference to this course	Prerequisite courses			
	Related basic courses	신호및 시스템, 통신 시스템, 확률및 랜덤변수, 선형대수		
	Recommended concurrent courses	디지털통신시스템		
	Related advanced courses	이동통신네트워크		

Instructor	Name (title/division)	Ran Rong(Assistant Professor, Electrical and Computer Engineering)				
	Office Room Number	종합관 603호	Office phone Number	2375	e-mail	
	Office hours		Homepage address			
Teaching Assistant	Name (title/division)					
	Office Room Number		Office phone Number		e-mail	

1. Introduction

This course will provide students with a comprehensive understanding of the fundamental principles underlying wireless communications. These principles include the characteristics and performance limits of wireless systems, the techniques and mathematical tools needed to analyze them, and so on. By accomplishing the course goals, the attendants can obtain the fundamental knowledge for further research on wireless communications.

2. Course Objectives

Students will learn about the fundamental theories of wirless communications and how to used them in practical systems.

3. Class types and activities

- The lecturer delivers lectures on characteristics and performance limits of wireless systems, the techniques (e.g., MIMO and OFDM) and mathematical tools needed to analyze them

- The attendants will perform matlab simulations to evaluate the performances of some techniques.

4. Teaching Method

- [V] lecture
- [ ] discussion and debate
- [ ] team project(presentation and case studies)
- [ ] experiments(role-playing,etc)
- [ ] designing and production
- [ ] on-site learning(on-site training)
- [ ] others

5. Support Systems in Use

- [V] AjouBb
- [ ] automatic recording system
- [ ] web-based assignment
- [ ] cyber lecture
- [ ] online content
- [ ] class behavior analyazing system
- [ ] others

6. Teaching Tools

- [ ] PBL(Problem Based Learning)
- [ ] CBL(Case Based Learning)
- [ ] TBL(Team Based Learning)
- [ ] UR(Undergraduate Research)
- [ ] FL(Flipped Learning)
- [ ] DSAL(Data Science Active Learning)
- [ ] others

7. Knowledge and ability required for taking this course

- Basic knowledge on Matlab.

8. Method of Evaluation

Evaluation Item	The Number of Times	Evaluation Proportion	Remarks
Attendance		5%	
midterm exam		40%	
final exam		40%	
quiz			
presentation			
discussion			
homework		15%	
etc			
study hours			

9. Textbook and supplementary material

Main/Sub	Title (Web-site)	Writer	Publisher	Publication year
Main	Wireless Communications	Andrea Goldsmith	Cambridge University Press	2005
Sub	Wireless Communications	Theodore S. Rappaport	Prentice Hall	2002
Sub	Fundamentals of Wireless Communication	Pramod Viswanath and David Tse	Cambridge University Press	2005

10. Class system and Class shedule

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
1	Overview of Wireless Communications		Ran Rong			
2	Wireless channels: Pathloss and Shadowing		Ran Rong			

< Class Schedule >

* language : K-korean, E-English

Weeks	Topics	language	Instructor	Teaching Method	Evaluation Method	Matter to be prepared
3	Wireless channels: Narrowband and Wideband Fading		Ran Rong			
4	Performance Metrics in Wireless Systems: Rate, Sum and Average Rate, Outage Rate, Min/Max Rate		Ran Rong			
5	Performance Metrics in Wireless Systems: BEP, Average BEP, Outage Probability and Coverage		Ran Rong			
6	Receiver Diversity Techniques		Ran Rong			
7	Transmit Diversity Techniques		Ran Rong			
8	Midterm		Ran Rong			
9	Background on Linear Algebra		Ran Rong			
10	MIMO Basics: Beamforming		Ran Rong			
11	MIMO Basics: Spatial Multiplexing		Ran Rong			
12	Tradeoffs between MIMO techniques		Ran Rong			
13	Multicarrier Modulation (OFDM)		Ran Rong			
14	Multicarrier Modulation (OFDM)		Ran Rong			
15	Challenges in Multicarrier Systems		Ran Rong			
16	Final		Ran Rong			

11. Other items of notification