

Introduction

I-Hsiang Wang (王奕翔)
ihwang@ntu.edu.tw

3/7, 2018

(this presentation will be posted on the [course website](#))

About the Course

Logistics

Lecturer

王奕翔

email

ihwang@ntu.edu.tw

office

明達館524□

office hour

週三 6 – 7pm



Teaching Assistants

周柏均

email & office hours:

d02942012@ntu.edu.tw

週四 8 – 9pm, MD-331



林禹欣

email & office hours:

f05942119@ntu.edu.tw

週二 8 – 9pm, MD-331



Time

週三 10:20 – 12:10 (34節)

Location

電機二館141室

Textbook

N/A. Lecture based on [slides and notes](#)

This course consists of two major parts

- **System and Theory**
- **Labs and Implementation**

Course Overview

- System and Theory – what **we** do **in-lecture**
 - ▶ Introduction to digital communication systems
 - ▶ Basic digital communications (modulation, synchronization, etc.)
 - ▶ Basic information theory and coding theory
 - ▶ Introduction to ISI, OFDM, and modern wireless systems
 - ▶ Survey a wireless technology and present it to the class
- Labs and Implementation – what **you** do **off-lecture**
 - ▶ Simulation using **LabVIEW**
 - ▶ Implementation over-the-air using **USRP**
 - ▶ Final project: implement a communication system using **USRP**

Grading Policy

- Grading:

Lab x4	40%	Mini Quiz	10%
Survey	20%	Final Project	30%

- Lab: work on your own! (but share the same **USRP** if necessary)
 - ▶ **LabVIEW**: work on the lab PC or your own computer
 - ▶ **USRP**: share the machine if necessary
- Survey presentation: June
- Final project proposal and progress presentation: June
- Final project demo: scheduled on the final exam week

Course Schedule

□	□ □	Lecture	Lab
2	03/07	Logistics; Introduction to Communication Systems	Lab 1: Basics of LabVIEW and USRP
3	03/14	Warm-up Exercise for Lab 1	
4	03/21	Demodulation	
5	03/28	Detection	Lab 2: Digital Modulation/Demodulation
6	04/04	Warm-up Exercise for Lab 2 [調課]	
7	04/11	Reliable Communications [IHW Travel] [補課]	Lab 3: Coded Transmission (Convolutional Code)
8	04/18	Convolutional Code [Proposal of Survey Topic]	
9	04/25	Warm-up Exercise for Lab 3	
10	05/02	Wideband System and ISI	Lab 4: Wideband System (OFDM Transceiver)
11	05/09	OFDM [Proposal of Final Project]	
12	05/16	Warm-up Exercise for Lab 4	Final Project
13	05/23	Wireless Communications	
14	05/30	Wireless Communications	
15	06/06	Presentations Part 1	Final Project
16	06/13	Presentations Part 2	
17	06/20	Presentations Part 3	
18	06/27	Final Project Presentation/Demo	

Handouts and Website

- Website:

<http://homepage.ntu.edu.tw/~ihwang/Teaching/Sp18/CommLab.html>

- Bookmark this page RIGHT AWAY

- ▶ Announcements are posted on the website.
- ▶ Lab handouts are posted on the website.



- **Your obligation** to keep track of the posts!
- Email announcements will be sent to your NTU email
(you should check your NTU email at least once per day!)

About the Labs

The LAB: MD Room 331

- Location: 明達館331室
 - ▶ Desktop PCs, laptops, oscilloscopes, signal generators, **USRP**
 - ▶ 24-hr video surveillance with access control (門禁設定)
- Rules:
 - ▶ Food and drink not allowed in the lab
 - ▶ No garbage left in the lab – there no garbage can in the lab
 - ▶ Do not bring unregistered students to the lab
- Lab session time:
 - ▶ No fixed sessions!
 - ▶ Free to use the lab at any time to work on lab or project
 - ▶ Each TA has 1-hour office hour at the LAB every week
 - ▶ **We encourage you to work around that time so that you get help from TA when you are stuck.**

Lab Work Policy (1 of 2)

- If not specified, simulation codes, results, and reports should be written **independently by each person**
 - ▶ Caught cheating for the first time ⇒ **final grade -10**
 - ▶ Caught cheating more than once ⇒ **Failed**
- **Lab reports are required to be typed** (format: PDF)
 - ▶ Handwritten report will not be accepted nor graded
- Lab reports and project reports should be submitted via **CEIBA** before the deadline; other kinds of submission will not be accepted

Lab Work Policy (2 of 2)

- Lab reports
 - ▶ Due: 9pm on Friday unless specified otherwise
 - ▶ Submission: CEIBA
- Content of your report:
 - ▶ Answer the questions in the handout posted on the website
 - ▶ Also, summarize and discuss about what you did and discovered during the lab
- Late report policy
 - ▶ 00hr – 24hr grade \times 0.8
 - ▶ 24hr – 72hr grade \times 0.5

About the Survey

Overview

- Sample Topics:
 - ▶ Internet of Things (Zigbee, Bluetooth, LoRa)
 - ▶ WiFi (IEEE 802.11 family)
 - ▶ mmWave (IEEE 802.15.3c, 60GHz)
 - ▶ Cognitive radio (IEEE 802.19, IEEE 802.22)
 - ▶ Body Area Network (IEEE 802.15.6)
 - ▶ LTE, LTE-A, 5G
- 40+5 minutes per group (5 minute Q&A)
- You should survey different topics.
- You should talk to me about the interested topics and get the approval to work on the survey

Presentation

- What to cover:
 - ▶ Scenario, Basic Principles
 - ▶ Commercial Applications
 - ▶ Competitors
 - ▶ Current Status and Future Developments
- Grading of the presentation includes
 - ▶ My grades
 - ▶ Average grades by all other students
- Mandatory for you to participate all presentations
 - ▶ Absence will be penalized in grades
- Grade sheet will be posted so that you know what metrics are important to prepare your presentation

Rest of Today

Agenda

- 加簽登記。
- Determine TA office hours (suggested lab sessions)
- Walk to the LAB (MD-331)
- 分組、實驗室打掃
- Introduction to **LabVIEW** and **USRP**

Thank You!

Further Questions:



ihwang@ntu.edu.tw

d02942012@ntu.edu.tw

f05942119@ntu.edu.tw



(this presentation will be posted on the [course website](#))