

# Experimental Steps and Requirements for 《Principles and Experiments of Communication》

Updated on October 5, 2018

Revised on October 31, 2018

## Preparation:

- Install LabVIEW software at least V12 (LabVIEW V12.0 is on <ftp://202.120.39.248> -> 软件下载) and USRP driver (NI-USRP Standalone on <ftp://202.120.39.248> -> 通信原理实验) before the first experiment lecture.
- Learn the method of LabVIEW programming especially the use of control and indicators by reading IV.Programming Demonstration: 1. AM modulation in Analog Modulation.doc.
- Each lab assignment requires two students to work as a team. In case a team cannot be formed, one student working alone is also acceptable.

## Lab Tutorials:

There will be three in-class tutorials for lab instruction at 东上院 100号-115号.

- Tutorial 1: 16:00 ~17:40 on Wednesday of the 5<sup>th</sup> week
- Tutorial 2: ~~16:00 ~17:40~~ 14:00 ~15:40 on Wednesday of the 8<sup>th</sup> week
- Tutorial 3: ~~16:00 ~17:40~~ 14:00 ~15:40 on Wednesday of the 12<sup>th</sup> week

## Lab Requirements:

### Lab1 - Frequency Modulation

- Please refer to Experiment 2 in the text book: Write LabVIEW codes of FM modem system according to Analog Modulation.doc. Write report in which the experiment graphs related and LabVIEW VIs should be provided.
- Submit an experiment report before Monday of the 8<sup>th</sup> week

### Lab2 - M-sequence and AWGN Channel

- Please refer to Experiment 3 in the text book: Write LabVIEW codes of M-sequence as the signal source and AWGN channel simulation model according to M-sequence generation and Channel modeling.doc. Write report in which the experiment graphs related and LabVIEW VIs should be provided.
- Submit an experiment report before Monday of the 10<sup>th</sup> week

### **Lab3 – Pulse Shaping and Matched Filtering**

- **Please refer to Experiments 4 & 5 in the text book:** Write LabVIEW codes of pulse shaping and matched filtering modules according to Pulse\_Shaping & Matched Filtering.doc. Write report in which the experiment graphs related and LabVIEW VIs should be provided. (Attention: The channel module still has its own program module and shall not be replaced with your own AWGN channel module.) Change related parameters of pulse shaping and matched filtering according to the lab requirement. Answer the questions given.
- Submit an experiment report before [Monday of the 12<sup>th</sup> week](#)

### **Lab4 – Channel Estimation and Equalization (functional validation)**

- **Please refer to Experiment 8 in the text book:** Run the whole communication system in simulator.vi which can be downloaded from <ftp://202.120.39.248> -> 通信原理实验 and then with USRP according to Channel Estimation and Equalization.doc. (Attention: The channel module still has its own program module and shall not be replaced with your own AWGN channel module.) Change related parameters or connectivity of the channel estimation and equalization modules according to the lab requirement. Answer the questions given.
- On-site check in the laboratory on [Wednesday afternoon of the 11th week](#)

### **Lab5 –Modulation and Demodulation (functional validation experiment)**

- **Please refer to Experiment 4,5 in the text book:** Run the whole communication system in simulator.vi and then with USRP according to BPSK/QPSK Modem.doc. (Attention: The channel module still has its own program module and shall not be replaced with your own AWGN channel module.) Change related parameters of the BPSK/QPSK modules according to the lab requirement. Answer the questions given.
- On-site check in the laboratory on [Wednesday afternoon of the 13th week](#)

### **Lab6 – Packet Transmission**

- **Please refer to Experiment 11 in the text book:** Write LabVIEW codes of some modules in packet transceiver system according to packet transceiver.doc. Run the whole system with USRP. Write report in which the experiment graphs related and LabVIEW VIs should be provided.
- On-site check in the laboratory on [Wednesday afternoon of the 16th week](#)
- Submit an experiment report before [Monday of the 17th week](#)