# Communication Systems

2 units (selection)

Atsushi Takada · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering, Takahiro Oie · Professor / Electrical and Electronic Systems, Electrical and Electronic Engineering, Systems Innovation Engineering

**Target**⟩ Understanding the designing and administrating scheme of wireless communication system and multi-nodes networks. And bring up faculty of designing original telecommunication system.

**Outline**⟩ Timing detection and regeneration of a phase and a frequency using a linear filter, design of a digital PLL, digital modulation and demodulation, and multiple access technique, e. g. FDMA, TDMA, CDMA in wireless communications. Design of data transmission protocol over optical data transmission system and computer networks, network administration techniques, e. g. DNS, and implementation of application program for internetworking.(Portfolio style)

**Style**⟩ Portfolio

***Keyword***⟩ ***phase locked loop, optical transmission system, optical transmission system using repeater-amplifier, photonic network system, computer networks, network architecture, network management***

**Fundamental Lecture**⟩ "**Advanced Theory of Digital Transmission**"(1.0), "**Advanced Theory of Electrical Communication**"(1.0)

**Relational Lecture**⟩ "**Photonic Semiconductor Device Physics**"(0.5)

**Requirement**⟩ Students are required to have a good understanding of communication engineering and related subjects up to master-level.

**Goal**⟩

1. Able to design the multiple-access wireless communication system (e.g. FDMA, TDMA, CDMA).(Lecture No. 8)
2. Able to design the wide-area data transmission network with repeaters).(Lecture No. 1-7)
3. Able to design the network architecture which satisfies the specified demands on multi-nodes network (e.g. computer networks).).(Lecture No. 9-16)

**Schedule**⟩

1. Timing detection and regeneration of a phase
2. Phase-locked loops and its components
3. Response to linear frequency variation
4. Digital modulation and demodulation
5. Designing the optical transmission system
6. Designing the optical transmission system using repeater-amplifier
7. Photonic network system
8. Mobile communication system (FDMA, TDMA, CDMA)
9. Transmission protocol of computer networks (Ethernet, ATM)
10. Transmission protocol of computer networks (TCP, UDP)
11. Network administration technique (DNS)
12. Network administration technique (SNMP, MIB)
13. Implementation of network application
14. Designing the application protocol
15. Distributed database system
16. Designing the distributed system

**Evaluation Criteria**⟩ Reports and presentation 100 %. More than 60 % is required to pass the class.

**Textbook**⟩

- ◇ Optical amplifiers and their applications
- ◇ Nonlinear fiber optics

**Contents**⟩ http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216701

**Student**⟩ Able to be taken by only specified class(es)

**Contact**⟩

⇒ A. Takada (Bldg. E-C3,656-7465, takada@ee) (Office Hour: A. Takada: Tue. 13:30-14:30, Thu. 16:30-17:30)

⇒ Oie (E-3F-C-1, +81-88-656-7479, alex@ee.tokushima-u.ac.jp) Mail (Office Hour: Tuesday 16:20~ 17:20, Thursday 16:50~ 17:50)