

1. Course Code

2224

2. Course Title

G12e:Information Network Exercises

3. Teacher

YOKOYAMA, Teruaki

4. Term

Fall 2

5. Course Requirements (Courses / Knowledge prerequisite for this course)

Fundamentals of Information Networks (2201). Basic understanding of shell environment on Linux or command line on Windows.

6. Course Overview and Objectives

The students experience the technologies for constructing and operating computer network and communication functionalities in programming. The aim is to gain an understanding and knowledge of the Internet technologies. The course consists of workshops along with the IP technologies on routers that are the essential technology of the Internet. Moreover, students will experience how to employ communication function on the Internet in their programming, such as Socket and HTTP.

7. Course Outline

- 1 Introduction
- 2 Initial Setup (Computer Setup)
- 3 Network Construction (Small size, 1 Router)
- 4 Network Construction (Small size, 1 Router)
- 5 Network Construction (Small size, Routing Configuration)
- 6 Network Construction (Small size, Routing Configuration)
- 7 Network Construction (Interconnection)
- 8 Network Construction (Interconnection)
- 9 Network Construction (Dynamic Routing, NAT)
- 10 Network Construction (Dynamic Routing, NAT)
- 11 Advanced experiments (monitoring, filtering)
- 12 Advanced experiments (monitoring, filtering)
- 13 Extra program (VyOS setup)
- 14 Extra program (VyOS trial)
- 15 Report / Presentation
- 16

8. Textbooks (Required Books for this course)

none

9. Reference Books (optional books for further study)

none

10. Course Goals (Attainment Targets)

- (1) To know how the Internet works on routers
- (2) To know mechanism of http communication
- (3) To know mechanism of Web API and its application
- (4)
- (5)
- (6)
- (7)
- (8)

11. Correspondence relationship between Educational goals and Course goals

| Educational goals of the school | | Course Goals | |
|---------------------------------|--|-------------------------|--|
| High level ICT skills | Basic academic skills | | |
| | Specialized knowledge and literacy | (1),(2),(3) | |
| Human skill (Tankyu skill) | Ability to continually improve own strengths | | |
| | Ability to discover and resolve the problem in society | Problem setting | |
| | | Hypothesis planning | |
| | | Hypothesis testing | |
| | | Practice | |
| | Fundamental Competencies for Working Persons | Ability to step forward | |
| Ability to think through | | | |
| Ability to work in a team | | | |
| Professional ethics | | | |

12. Evaluation

| Goals | Evaluation method & point allocation | | | | | |
|------------|--------------------------------------|------|---------|--------------|--------------|-------|
| | examination | Quiz | Reports | Presentation | Deliverables | Other |
| (1) | | | ○ | | | ○ |
| (2) | | | ○ | | | ○ |
| (3) | | | ○ | | | ○ |
| (4) | | | | | | |
| (5) | | | | | | |
| (6) | | | | | | |
| Allocation | | | | | | |
| (8) | | | | | | |
| Allocation | | | 30 | | | 70 |

13. Evaluation Criteria

| | |
|--------------|--|
| Examination | |
| Quiz | |
| Reports | The understanding of the network construction through the reporting of their construction result |
| Presentation | |

| | |
|--------------|---|
| Deliverables | |
| Other | To evaluate how the constructed network satisfy the requirements of the network from technical point of views, such as connectivity, stability, cost and performance. |

14. Active Learning

| | | |
|--|--|------------|
| Hourly percentage of active learning within the whole class time | | 0% |
| 1 | Active learning such as problem solving assignment using the knowledge and skills acquired in class. | Not at all |
| 2 | Active learning such as group works and discussions. | Not at all |
| 3 | Outcome presentations and feedbacks. | Sometimes |
| 4 | Students actively make decisions on how the class should be conducted. | Not at all |

15. Notes

Tuesday Lessons are taught by Shima

Saturday Lessons are taught by Yokoyama

16. Course plan

(Notice) This plan is tentative and might be changed at the time of delivery

Saturday-Lesson 1: Introduction (Lecture 90min)

- Overview of this lecture
- Communication on the Internet

Saturday-Lesson 2: Preparation (Exercise 90min)

- Grouping
 - RPI setup
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Saturday-Lesson 3: Network Construction (1) (Lecture 90min)

- Basic instruction for Linux (SSH, IP address assignment, Routing)

Saturday-Lesson 4: Network Construction (2) (Exercise 90min)

- Initial setup for RPI router

Saturday-Lesson 5,6,7,8: Network Construction (3)(4)(5)(6) (Exercise 360min)

- Network construction

1st level construction, one PC under one router

- Network test

ICMP (ping/traceroute), tcpdump

Saturday-Lesson 9,10,11,12: Network Construction (Exercise 360min)

- Network construction

2nd level construction, multiple routers

- Routing configuration

concept, routing add/del

Saturday-Lesson 13,14: Network Construction (11)(12) (Exercise 180min)

- Additional functions

Dynamic routing, ipfilter

NAT, DHCP, performance evaluation tools

Saturday-Lesson 15: Report (Exercise 90min)

- Report and presentation
