1. Course Code
2224

2. Course Title
G62e: 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 expeience the technologies for constructing and operating computer network and communication functionalities in programming. They learn the routing technolgies and operations with routers for how to construct IP network on virtualized environment on Virtualbox software. 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.

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

(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 undestanding of the network constrution 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

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
- Virtualbox setup

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 Linux environment on Virtualbox

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

- Network construction
1st level construction, two VMs for computer and router
- Network test
ICMP (ping/traceroute), tcpdump

Saturday-Lesson 9,10,11,12: Network Construction (7)(8)(9)(10)	(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