1. Course Code

2216

2. Course Title

G21e: Linux Applications

3. Teacher

OKUDA, Ryosuke

4. Term

Spring 2

5. Course Requirements (Courses / Knowledge for this course) and Important Information

6. Course Overview and Objectives

This course is a Linux primer for beginners. Unlike Windows and Mac, Linux users can enjoy its full performance by using various commands including shell and filters. Also users should understand the model of process, memory, file system of Linux. This course will provide a knowledge and skills of using basic Linux commands and also a basic idea of the internal structure of Linux.

7. Course Outline

1 Ubuntu as a desktop computer
2 Getting familiar with GNOME GUI
3 First steps on basic commands of Linux
4 Practice on basic commands
5 What happens when a command is executed
6 Environmental variables and job control
7 Pipes and filters
8 Practice on pipes and filters
9 Shell scripts
10 Practice on writing shell scripts
11 Account control and security on Linux
12 Group work: "What Linux is" & "Why people use Linux"
13 Virtual memory
14 Linux process memory model
15 Group work presentation
16 Term end examination

8. Textbooks (Required Books for this course)

"Linux Fundamentals" by Paul Cobbaut, which can be download from
http://linux-training.be/linuxfun.pdf

9. Reference Books (optional books for further study)

None.

10. Course Goals (Attainment Targets)

(1) To be able to use basic commands of Linux
(2) To understand the structure of Linux
(3) To be able to make shell scripts
(4) To understand what Linux is
(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		(1)
	Specialized knowledge and literacy		(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	(4)
		Ability to work in a team	(4)
Professional ethics			

12. Evaluation

Goals	Evaluation method & point allocation					
	examination	Quiz	Reports	Presentation	Deliverables	Other
(1)	○		○			
(2)	○		○			
(3)	○		○			
(4)				○		
(5)						
(6)						
(7)						
(8)						
Allocation	30		50	20		

13. Evaluation Criteria

Examination	A correct understanding of the Linux basic commands and concepts described in the class。
Quiz	
Reports	A correct understanding of Linux security mechanisms. Be able to combine commands to achieve complex processing.
Presentation	Essential ideas of Linux and why people use Linux must be explained.
Deliverables	
Other	

14. Active Learning

Hourly percentage of active learning within the whole class time	10%

1	Active learning such as problem solving assignment using the knowledge and skills acquired in class.	Sometimes
2	Active learning such as group works and discussions.	Sometimes
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

Lesson 1 and 2: Introduction to Linux — Lecture 90 min + Exercise 90 min

"Ubuntu" is a popular distribution of Linux. Each student will install Ubuntu 22.04 to students' PC or a PC at classroom D and learn basic operation using GUI.

1) History of Linux
2) Free and Open Source License
3) Getting familiar with GNOME UI

Lesson 3 and 4: First steps on basic commands of Linux — Lecture 90 min + Exercise 90 min

Apart from the graphical tools of Ubuntu, students will learn basic commands using the command line interface.

1) Working with directories
2) Working with files
3) Using editor
4) Practice of creating self introduction web page

Lesson 5 and 6: What happens when a command is executed — Lecture 90 min + Exercise 90 min

The Linux command line interface, shell, executes various tasks after an user enter a command before the command is executed. Understanding the behaviors is the basic of shell scripting.

1) Commands and arguments
2) Expansion
3) Shell variables
4) Control operators
5) Shell history

Lesson 7 and 8: Pipes and filters — Lecture 90 min + Exercise 90 min

Most of the Linux commands are designed to work with other commands. Combining multiple commands enables more powerful data processing. Students will learn how to combine commands.

1) Pipes and I/O redirection
2) Simple Filters

Lesson 9 and 10 : Shell scripts — Lecture 90 min + Exercise 90 min

Shell script is one of most powerful features of Linux. It is a kind of programming language which enables users to automate complicated tasks. Students will learn basics of shell script.

1) "[" command
2) Conditional execution
3) Loops
4) Shell functions

Lesson 11: Account and security — Lecture 90 min

Managing user accounts and file security is the basic of Linux system management. Students will learn the basic idea and commands for managing them.

1) Account Management
2) ACL (Access Control List)
3) Package management
4) FIrewall
5) DNS
6) Git

Lesson 12: "What Linux is" and "Why people use Linux" — Group work 90 min

Several groups are formed with three or four students. Each group is requested to do group work to find out "What Linux is" and "Why people use Linux". Each group also requested to give a presentation on the findings in Lesson 15.

Lesson 13 and 14: Process and memory model — Lecture 90 min + Exercise 90 min

This lesson addresses a basic internal structure of Linux. Students will learn how multi process computer system works safely.

1) Virtual memory system
2) Linux process memory model
3) Privileged operation
4) Countainer and Docker engine

Lesson 15: Presentation — Presentation 90 min

Each group which was formed in Lesson 12 is requested to give a short presentation on "What Linux is" and "Why people use Linux".

Lesson 16: Term-end Examination — Examination 90 min

A term-end exam will be conducted.