1. Course Code

2222

2. Course Title

G61e: Advanced Information Network

3. Teacher

YOKOYAMA, Teruaki

4. Term

Fall 1

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

Fundamentals of Computer Systems
Fundamentals of Information Networks

6. Course Overview and Objectives

This course aims to equip students with practical network technology skills by focusing on server/network construction and utilization within the AWS cloud environment. Through fundamental AWS cloud usage, students will gain knowledge about server and network operations. You'll gain an understanding of servers and networks, and learn how to use AWS cloud services. By engaging in lectures and exercises, students can strive to become highly sought-after cloud engineers with expertise in networking.

7. Course Outline

1 Introduction to the Course
2 Networks and Servers
3 Hands-on IP Technology (1)
4 Hands-on IP Technology (2)
5 Introduction to Cloud Computing on AWS (1)
6 Hands-on AWS (Basics)
7 Hands-on AWS (EC2)
8 Hands-on AWS (EC2)
9 Introduction to Cloud Computing on AWS (2)
10 Hands-on AWS (EC2+VPC)
11 Hands-on AWS (EC2+VPC)
12 Hands-on AWS (Web Service with EC2)
13 Hands-on AWS (Web Service with EC2)
14 Hands-on AWS (EC2 Advanced)
15 Conclusion
16

8. Textbooks (Required Books for this course)

None

9. Reference Books (optional books for further study)

Introduce official documents and other resources provided by AWS.

10. Course Goals (Attainment Targets)

(1) Be able to explain the technologies and characteristics of IP networks.
(2) Be able to explain cloud systems, using AWS cloud as an example.
(3) Be able to perform basic operations on cloud systems, using AWS cloud as an example.
(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		(1),(2)
	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	
		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)						
(7)						
(8)						
Allocation			60		40	

13. Evaluation Criteria

Examination	
Quiz	
Reports	Assess your knowledge of IP networking and cloud technologies across various topics and present your findings based on the cloud based products you created.
Presentation	
Deliverables	Build the specified system or other components on the AWS cloud and report the results.
Other	

14. Active Learning

Hourly percentage of active learning within the whole class time	20%

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

For those students who are progressing quickly and are willing, we will ask them to assist other students.

For students who lack confidence in participating alone, we will offer options such as joining a group.

16. Course plan

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

Lesson 1: Introduction to the Course   (Lecture 90 min)

In this lecture, we will discuss the content and learning objectives of this course. We will explain what the Internet and cloud technologies, which are the subjects of this course, are, how we will proceed with our learning, and our ultimate goals. We will also discuss what becomes possible through the use of the Internet and cloud and what kind of knowledge is required to achieve this. Furthermore, we will provide an explanation of the AWS cloud, which will be the focus of our hands-on exercises.

Lesson 2: Networks and Servers   (Lecture 90 min)

In this lecture, we will (1) assess the students' knowledge of internet technologies and (2) learn about the combined structure of servers and networks, which forms the basis of internet services.

Lesson 3: Hands-on IP Technology (1)   (Exercise 90 min)

In this lecture, we will conduct experiments to investigate network conditions using tools like ping and traceroute from a local PC, allowing you to experience the network firsthand. Additionally, in preparation for future use, we will register for an AWS Educate account to utilize the AWS cloud.

Lesson 4: Hands-on IP Technology (2)   (Exercise 90 min)

In this lecture, we will conduct experiments to investigate network conditions using tools like ping and traceroute from a local PC, allowing you to experience the network firsthand. Additionally, in preparation for future use, we will register for an AWS Educate account to utilize the AWS cloud.

Lesson 5: Introduction to Cloud Computing on AWS (1)   (Lecture 90 min)

In this lecture, we will learn about the overview of AWS, which we will be utilizing from now on. We will study the concepts of services provided within AWS, such as EC2 and VPC, which we will be using.

Lesson 6: Hands-on AWS (Basics)   (Exercise 90 min)

n this lecture, we will attempt to log in to AWS. We will access the EC2 service and students will try creating an EC2 server.

Lesson 7: Hands-on AWS (EC2)   (Exercise 90 min)

In this lecture, we will work on creating multiple EC2 servers and creating EC2 servers in different regions.

Lesson 8: Hands-on AWS (EC2)   (Exercise 90 min)

In this lecture, we will work on creating multiple EC2 servers and creating EC2 servers in different regions.

Lesson 9: Introduction to Cloud Computing on AWS (2)   (Exercise 90 min)

In this lecture, we will learn about the overview of AWS, which we will be utilizing from now on. In addition to EC2, we will also learn about network isolation within AWS, such as VPC and subnets.

Lesson 10: Hands-on AWS (EC2+VPC)   (Exercise 90 min)

In this lecture, we will work on creating VPCs and subnets. We will prepare multiple EC2 servers and conduct connection experiments within the AWS network.

Lesson 11: Hands-on AWS (EC2+VPC)   (Exercise 90 min)

In this lecture, we will work on creating VPCs and subnets. We will prepare multiple EC2 servers and conduct connection experiments within the AWS network. Students who have successfully reached this point will challenge themselves to combine multiple servers to create a web service.

Lesson 12: Hands-on AWS (Web Service with EC2)   (Exercise 90 min)

n this lecture, we will engage in hands-on experiments to build web services using EC2. Depending on your progress so far, you will challenge yourself with one of the following: (1) building a simple web server to store static content, (2) building a web server with a CMS installed, or (3) building a multi-server configuration with a separated front-end and database.

Lesson 13: Hands-on AWS (Web Service with EC2)	(Lecture 90 min)

n this lecture, we will engage in hands-on experiments to build web services using EC2. Depending on your progress so far, you will challenge yourself with one of the following: (1) building a simple web server to store static content, (2) building a web server with a CMS installed, or (3) building a multi-server configuration with a separated front-end and database.

Lesson 14: Hands-on AWS (EC2 Advanced)	(Lecture 90 min)

In this lecture, we will conduct experiments on creating EC2 servers from the CLI, autoscaling multiple instances, and more. We will also introduce a demonstration of load balancing.

Lesson 15: Conclusion	(Lecture 90 min)

In this lesson, the course content from the 1st up to 14th is reviewed briefly for confirming and supporting student's understanding.

1. A summary of the whole course content
2. Writing report