

**1. Course Code**

2210

**2. Course Title**

G72e:Artificial Intelligence Exercises

**3. Teacher**

IWAMOTO, Hisashi

**4. Term**

Fall 3

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

Taking a "F30e: Fundamentals of Computer Programming Python" course

**6. Course Overview and Objectives**

In this course, students learn the foundation of Artificial Intelligence(AI) and aim to get the ability to use AI in practice.

The area of study includes image classification, image recognition, data analysis, and anomaly detection.

**7. Course Outline**

- 1 Overview of Artificial Intelligence
- 2 Densely Connected Neural Network(DNN)
- 3 Data Augmentation
- 4 Convolutional Neural Network(CNN)
- 5 Sequence Processing
- 6 Regression
- 7 Feature Extraction/Fine Tuning
- 8 Heat Map / Class activation map(CAM)
- 9 Prediction
- 10 Image denoising
- 11 Anomaly Detection
- 12 Yolo (End to End Learning)
- 13 Annotation / Yolo
- 14 Vision Transformer
- 15 Course Summary
- 16

**8. Textbooks (Required Books for this course)**

None

**9. Reference Books (optional books for further study)**

<https://www.manning.com/books/deep-learning-with-python-second-edition>

<https://www.oreilly.com/library/view/hands-on-unsupervised-learning/9781492035633/>

**10. Course Goals (Attainment Targets)**

- (1) To understand the fundamental operation of AI
- (2) To become proficient through AI practical exercises
- (3) To be able to use AI
- (4) To be able to make AI-based systems
- (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)
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	(3)(4)
		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						

### 13. Evaluation Criteria

Examination	
Quiz	
Reports	Reports in every two weeks evaluates students understand the key contents of the lectures and materials.
Presentation	
Deliverables	
Other	Evaluates the participation and understanding of the excersize in the class

### 14. Active Learning

Hourly percentage of active learning within the whole class time		50%
1	Active learning such as problem solving assignment using the knowledge and skills acquired in class.	All the time
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.	Sometimes

## 15. Notes

Class materials are offered as pdf files. Your PC (Windows, Mac or Linux) and the Internet connection are required for the class and homeworks.

## 16. Course plan

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

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Lessen 1: Overview of Artificial Intelligence	(Lecture 90 min.)
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Lessen 2: Densely Connected Neural Network(DNN)	(Lecture 45 min., Exercise 45 min.)
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Lessen 3: Data Augmentation	(Lecture 45 min., Exercise 45 min.)
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Lessen 4: Convolutional Neural Network(CNN)	(Lecture 45 min., Exercise 45 min.)
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Lessen 5: Sequence Processing	(Lecture 45 min., Exercise 45 min.)
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Lessen 6: Regression	(Lecture 45 min., Exercise 45 min.)
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Lessen 7: Feature Extraction/Fine Tuning	(Lecture 45 min., Exercise 45 min.)
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Lessen 8: Heat Map / Class activation map(CAM)	(Lecture 45 min., Exercise 45 min.)
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Lessen 9: Prediction	(Lecture 45 min., Exercise 45 min.)
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Lessen 10: Image denoising	(Lecture 45 min., Exercise 45 min.)
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Lessen 11: Anomaly Detection	(Lecture 45 min., Exercise 45 min.)
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Lessen 12: Yolo (End to End Learning)	(Lecture 45 min., Exercise 45 min.)
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Lessen 13: Annotation / Yolo	(Lecture 45 min., Exercise 45 min.)
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Lessen 14: Vision Transformer	(Lecture 45 min., Exercise 45 min.)
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Lessen 15: Course Summary	(Lecture 90 min.)
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