

<b>1. Course Code</b>	
	2261
<b>2. Course Title</b>	
	G51e: Data Science
<b>3. Teacher</b>	
	HAMIDULLAH, Sokout
<b>4. Term</b>	
	Spring 1
<b>5. Course Requirements (Courses / Knowledge prerequisite for this course)</b>	
Basic Knowledge of Statistics and Computer Programming (But NOT Essential)	
<b>6. Course Overview and Objectives</b>	
<p>Data Science has a big impact on the business landscape, which is constantly changing in today's world. As the quantity of human connection with digital footprint increases daily, an unimaginable large mass of fine-grained data is generated on a regular basis. Global internet users have climbed to 4.95 billion at the start of 2022, with internet penetration now standing at 62.5 percent of the world's total population. The data generated behind could be definitely useful to analyze existing issues, reveal previously hidden opportunities and predict future insights. Companies will compete for hundreds of thousands of new workers needed to navigate the digital world. Already, experts estimate that millions of jobs in DATA SCIENCE might remain vacant for the lack of readily available talent.</p> <p>This course is about the world of data science. In this course we will start with an introduction where we will discuss the world of data science. I explain why data science is important and how it helps businesses stay competitive in this day and age. Then continues by introducing important mathematical and statistical concepts that are essential to do data science. Once we have laid out a solid foundation, we will be ready to learn Python and Database for Data Science. Starting from the very basics, we will build up your skills and soon you will be able to play with analysis of data with Python.</p>	
<b>7. Course Outline</b>	
1	Course orientation and Introduction to Data Science
2	Major terminologies in Data Science
3	Data Science Tools and Methodology



Human skill (Tankyu skill)	Ability to discover and resolve the problem in society	Problem setting	(6)
		Hypothesis planning	(2) (3) (6)
		Hypothesis testing	(2) (3) (6)
		Practice	(6)
	Fundamental Competencies for Working Persons	Ability to step forward	
		Ability to think through	(3)
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		25		40	35	

## 13. Evaluation Criteria

Examination	
Quiz	Every week multiple choice quizzes are used to evaluate the understanding of students and motivate them for further learning.
Reports	
Presentation	In the final presentation, students will be asked to choose and summarize a scientific research journal paper or their own ideas related to the course main objectives and contents. The evaluation will be based on participation in the group presentation, the structure of presentation, the relevance of the argument, time management and relation to the course contents.
Deliverables	Individual and group assignment will be assigned for the students with focus on learning goals (2,3, and 5). The evaluation will be based on how the students understand the exercises and participation.
Other	

## 14. Active Learning

Hourly percentage of active learning within the whole class time		60%
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.	Not at all

#### 15. Notes

This course is like a journey by attending it you will benefit and might enjoy. Please bring your own computer in the class.

#### 16. Course plan

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

Lessen 1: (Course Orientation and Introduction to Data Science)	(90 min)
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1. Introduction, Evaluation, Scope of the Course.
2. What is Data Science.
3. Emerging Technologies shaping the modern data

Lessen 2: ( Major Terminologies in Data Science )	(90 min)
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1. What is difference:
  - a. Big Data
  - b. Data Mining
  - c. Machine Learning
  - d. Deep Learning
  - e. Neural Networks

Lessen 3: (Data Science Tools and Methodology)	(90 min)
<ol style="list-style-type: none"> <li>1. Tools for Data Science</li> <li>2. Data Science Methodology</li> </ol>	
Lessen 4: (Fundamentals of Data Science )	(90 min)
<ol style="list-style-type: none"> <li>1. Data <ol style="list-style-type: none"> <li>a. Traditional</li> <li>b. Big</li> </ol> </li> <li>2. Data Science <ol style="list-style-type: none"> <li>a. Business Intelligence</li> <li>b. Traditional Methods</li> <li>c. Machine Learning</li> </ol> </li> </ol>	
Lessen 5: (Statistics for Data Science)	(90 min)
<ol style="list-style-type: none"> <li>1. Population vs Sample</li> <li>2. Types of Data</li> <li>3. Exercises</li> </ol>	
Lessen 6: (Distribution)	(90 min)
<ol style="list-style-type: none"> <li>1. Distribution</li> <li>2. Confidence Intervals</li> <li>3. Exercises</li> </ol>	
Lessen 7: (Hypothesis Testing)	(90 min)
<ol style="list-style-type: none"> <li>1. Hypothesis Testing <ol style="list-style-type: none"> <li>a. Null Hypothesis</li> <li>b. Alternative Hypothesis</li> <li>c. Error in Hypothesis</li> </ol> </li> </ol>	
Lessen 8: (P-value)	(90 min)
<ol style="list-style-type: none"> <li>1. P-Value</li> <li>2. Exercises</li> <li>3. Basics of Python for Data Science</li> </ol>	
Lessen 9: (Python for Data Science)	(90 min)

1. Python Basics 2. Python Statements 3. Python Loops 4. Python Functions 5. Python Object Oriented Programming	
Lessen 10: (Python for Data Science Exercises)	(90 min)
Exercises	
Lessen 11: (Database and SQL for Data Science)	(90 min)
1. Database Concepts 2. SQL Statements 3. SQL Joins	
Lessen 12: Database and SQL for Data Science Exercises)	(90 min)
Exercises	
Lessen 13: (Data Analysis with Python, Part I, II)	(90 min)
1. Data Analysis with Python a. Pandas b. Numpy	
Lessen 14: (Data Analysis with Python Exercises)	(90 min)
Exercises	
Lessen 15: (Presentation by Students)	(90 min)
Group Presentation by students	
Lessen 16: (Presentation by Students)	(90 min)
Group Presentation by students	