

Course Outline: “AI and Data Science Education Program for Working Adults Aiming for DX”

Introduction

No.	Date	Course Goal	Session (3 hours)	Instructor	Overview
1	7/1	This course is designed to give beginners in data science a foothold for further learning. Participants acquire foundational implementation skills useful for understanding data science by learning Python basics. They also learn fundamental data-science concepts and understand its value through examples of its use in society.	An Introduction to Data Science	Shinsuke Uda	Learn about the concepts of models in statistics and machine learning, as well as how computers work.
2	7/8		Python Basics 1	Yudai Yamamoto	Learn Python fundamentals, particularly Google Colab and basic Python syntax.
3	7/15		Python Basics 2	Yudai Yamamoto	Learn Python fundamentals, particularly arrays, lists, and how to use libraries.
4	7/22		First Steps in Data Science	Shinsuke Uda	Learn introductory data-science methods through basic techniques such as classification and clustering.
5	7/29		Applications of Data Science	Toshiyuki Kurihara	Explore examples of applying data science to strategy and management in sports.

Statistics

No.	Date	Course Goal	Session (3 hours)	Instructor	Overview
1	8/19	This course introduces the foundations of statistics for summarizing data, analyzing relationships, and making inferences based on probability models. Participants study descriptive statistics, simple linear regression, random variables and probability distributions, statistical inference, and hypothesis testing, deepening their understanding through exercises.	Descriptive Statistics	Takuya Kitamoto	Learn the basics of descriptive statistics and complete exercises in Python.
2	8/26		Simple Linear Regression	Jimmy Doi (External Lecturer)	Learn the basics of regression analysis and complete exercises in Python.
3	9/2		Random Variables and Probability Distributions	Mitsuharu Akai	Learn the basics of random variables and probability distributions and complete exercises.
4	9/9		Statistical Inference	Takuya Kitamoto	Learn the basics of statistical inference and complete exercises.
5	9/16		Statistical Hypothesis Testing	Takuya Kitamoto	Learn the basics of statistical hypothesis testing and complete exercises.

Machine Learning

No.	Date	Course Goal	Session (3 hours)	Instructor	Overview
1	10/7	This course covers the fundamentals of machine learning - in which computers learn from data to perform processing - and the foundational technologies that support AI. Participants deepen their understanding through exercises.	Overview of Machine Learning	Yasushi Hirano	Learn what machine learning is, its history, objectives, and methods, along with advanced Python topics needed to study machine-learning methods. Exercises are included.
2	10/14		Supervised Learning	Yusuke Fujita	Learn the basics of supervised learning, a machine-learning method, and complete exercises.
3	10/21		Unsupervised Learning	Yusuke Fujita	Learn the basics of unsupervised learning, a machine-learning method, and complete exercises.
4	10/28		Neural Networks	Yasushi Hirano	Learn the basics of neural networks, the foundation of current AI technologies such as deep learning and generative AI, and complete exercises.
5	11/4		Generative AI	Toshikazu Samura	Learn the basics of Transformers and generative models used in current AI technologies, and complete exercises.
6	11/11		Data Preprocessing	Thanawit Gerdprasert	Learn the fundamentals of preprocessing appropriate to data, including basic handling of missing values and outliers, normalization, and feature selection. Exercises are included.
7	11/18		Tuning Machine-Learning Methods	Toshikazu Samura	Learn methods for improving the performance of machine-learning techniques and complete integrated exercises.

Digital Transformation (DX)

No.	Date	Course Goal	Session (3 hours)	Instructor	Overview
1	12/2	This course develops a management-oriented understanding of DX: its concept, necessity, and examples of implementation. Participants learn the perspectives and related technologies needed to promote DX. They also study DX initiatives that leverage strengths cultivated through operating businesses in Yamaguchi Prefecture, with the goal of increasing motivation to pursue DX in their own organizations.	The DX Context: Mindset and Orientation	Shingo Mabu	Using data and examples, learn why DX is needed and why changes in mindset and orientation matter. Explore changes in customers and the competitive environment driven by advances in digital technology.
2	12/9		Data and Technology Used in DX	Shingo Mabu	Learn the data-driven decision-making process, sample surveys, analytical-approach design, and related technologies such as AI and cloud computing needed to promote DX.
3	12/16		DX Case Studies	Shuichi Yuasa	Using examples of companies in Yamaguchi Prefecture, study DX through case studies from the perspective of innovation (new combinations). Learn the importance of "locally originated DX," made possible by companies operating in Yamaguchi Prefecture.