Course Title	Artificial Intelligence and Machine Learning		
Department/Course	Graduate School of Marine Science and Technology　Master's Course		
Category/Spacializations	<Graduate School Subjects>,<Other Courses' Subjects>		
Year Offered	1st	Class	10
Required or Elective	elective	Credit	2
Semester	First Semester	Course Type	
Day/Period	TUE 4 ,TUE 5	Lecture Room	
Chief Instructor	Matsui Kazunori		
Instructors	Matsui Kazunori		
Theme & Objects	The aim of this course is to understand the history and background of artificial intelligence and to learn the fundamental theories of machine learning. This includes deepening the understanding of specific algorithms through theoretical aspects and practical application using Python.		
Learning Outcomes	Students understand and can explain the basic terminology of artificial intelligence and machine learning. They understand what techniques such as linear regression, k-nearest neighbors, and k-means clustering, etc., are and can select and apply these methods appropriately according to the situation.		
Styles of Class	Combination of remote (real-time and on-demand) Note: "Combination" includes simultaneous live streaming of in-person classes, conducting classes in-person or remotely on a per-session basis, or a mix of both approaches.		
Course Contents	1. About Artificial Intelligence & Machine Learning 2. Theory and Implementation of Regression: Python and Simple Linear Regression 3. Theory and Implementation of Regression: Multiple Linear Regression 4. Theory and Implementation of Regression: Regularization of Linear Regression 5. Theory and Implementation of Classification: k-Nearest Neighbors 6. Theory and Implementation of Classification: Decision Trees 7. Midterm Summary 8. Theory and Implementation of Classification: Logistic Regression 9. Theory and Implementation of Classification: Support Vector Machines 10. Theory and Implementation of Clustering 11. Fundamentals of Neural Networks 12. Implementation of Neural Networks 13. Recent Topics in Neural Networks		
Prerequisites	A foundational understanding of linear algebra, calculus, and basic statistical calculations (such as matrix multiplication, differentiation, and expectation) is required as prior knowledge. Experience with Python is optional, but having a basic understanding beforehand is recommended to reduce the workload for preparation and review.		
Textbook / References	Course materials will be available on Google Drive: https://drive.google.com/drive/folders/1Y5EjtND9rcE7SQ1F8GOLnZQ3h21SIq6C?usp=drive_link		
Preparation & Review	Prepare for classes using the lecture materials distributed in class, and review the materials and your notes.		
Assessment and Examinations	Assessment will be based on a final report (50%) and in-class reports (50%).		
Evaluation Criteria	The minimum criteria for passing are based on the attainment level of understanding the following: 1. Understanding the specialized terminology related to artificial intelligence and machine learning. 2. Being able to perform calculations based on machine learning methods.		
Teaching activities & methods			
Instructor Contact Information	Appointments must be made in advance via email. kmat002＊kaiyodai.ac.jp　　Please replace "＊" by "@".		
Other Information			
URL			
Code			
Teaching Language	English Note: Japanese materials and explanations or question handling in Japanese will be provided as needed.		
Workload Calculation			
Related Degree Awarding Policy			
Relation to SDGs	4 Quality education 9 Industry, Innovation, and Infrastructure		