Course Title	Data Science		
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	Second Semester	Course Type	
Day/Period	INTENSIVE	Lecture Room	
Chief Instructor	Mizobata Kohei		
Instructors	Mizobata Kohei		
Theme & Objects	In this class, you will learn the data science with applications in earth science and oceanography. In addition, methods used in big data analyses will be introduced.		
Learning Outcomes	(1) Understand and explain data science and big data in earth science and oceanography. (2) Apply the statistical methods to big data in earth sciences and fisheries sciences.		
Styles of Class	combination: online classes(real-time/on-demand)		
Course Contents	In this lecture, we will learn about analysis methods and examples of big data such as ocean observation data, climate reanalysis data, and satellite data through research examples in earth science and oceanography. The following is the content of this course. About data science and big data Basic statistics, correlation coefficient, linear regression, lag correlation, multiple regression Data analysis exercise Fourier analysis Spectral analysis Filtering Wavelet Composite analysis, dimensionality reduction (EOF) 1 - Principal Component Analysis: Arctic Oscillation, Pacific Decadal Oscillation, Antarctic Oscillation, etc. - Singular value decomposition: sea level pressure vs. sea surface temperature, etc. 9. Dimensionality reduction (EOF) 2 10. data visualization - 1-D/2-D/3-D plots including Hovmoller, T-S diagram, Wind Rose etc. using GMT, MATLAB		
Prerequisites			
Textbook / References	「Data analysis methods in Physical Oceanography」 by W. J. Emery and R. R. Thompson, Elsevier.		
Preparation & Review	The information will be updated at the following URL from time to time, so please review each time.		
Assessment and Examinations	The level of comprehension of the lecture contents is evaluated by the sum of the report (100%).		
Evaluation Criteria	The following achievement levels will be the minimum criteria for acceptance. (1) Understand the technical terms learned in the lectures and the principles of satellite observation accurately. (2) Understand and explain the basics of big data analysis.		
Teaching activities & methods	Lectures and hands-on excercises. if in-person instruction cannot be opened, online lectures will be help using Microsoft Teams.		
Instructor Contact Information	Make an appointment in advance. Email address: mizobata (at) kaiyodai.ac.jp, ayako.yamamoto (at) kaiyodai.ac.jp * "(At)" should be changed to @		
Other Information			
URL	http://www2.kaiyodai.ac.jp/~mizobata/DataScience		
Code			
Teaching Language	English (Japanese is available if necessary)		
Workload Calculation			
Related Degree Awarding Policy			
Relation to SDGs	13 Climate action 14 Life below water		