

Toyama College		Year	2022		Course Title	Introduction to Geoscience	
Course Information							
Course Code	0030			Course Category	Specialized / Elective		
Class Format	Lecture			Credits	Academic Credit: 2		
Department	Control Information Systems Engineering Course			Student Grade	Adv. 2nd		
Term	Second Semester			Classes per Week	2		
Textbook and/or Teaching Materials	Teacher distribution documents						
Instructor	Fukudome Kenichi						
Course Objectives							
Through this course, understanding of the following will be facilitated. (1) What does the the geophysical fluid dynamics (2) The governing equations of geophysycal fluid dynamics (3) The characteristics of the geophysical fluid dynamics							
Rubric							
		Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)		Unacceptable Level of Achievement (Fail)		
Evaluation 1		Clearly understands the general idea of the geophysical fluid dynamics and displays the ability to explain it	Ability to understand the general idea of the geophysical fluid dynamics		Unable to understand the general idea of the geophysical fluid dynamics		
Evaluation 2		A thorough understanding of the fundamental processes governing oceanic and atmospheric motions	Basic understanding of the fundamental processes governing oceanic and atmospheric motions		Unable to understand the fundamental processes governing oceanic and atmospheric motions		
Assigned Department Objectives							
ディプロマポリシー B-1 JABEE B1							
Teaching Method							
Outline	This class is designed to introduce students to the physics that govern the phenomena in the ocean and atmosphere.						
Style	Students are expected to attend all classes on time. Your grade will be based participation (attendance and homework : 40%) and on a final presentation (60%).						
Notice	Basic fluid mechanics and physics knowledge, vector calculus, partial differential equations.						
Characteristics of Class / Division in Learning							
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input type="checkbox"/> Applicable to Remote Class		<input type="checkbox"/> Instructor Professionally Experienced	
Course Plan							
			Theme		Goals		
2nd Semester	3rd Quarter	1st	Introduction to the geophysical fluid dynamics		Characteristics of the ocean and the atmosphere, general idea of the geophysical fluid dynamics		
		2nd	The governing equations (1)		Continuity of mass, Equation of Motion, Lagrangian and Eulerian Approaches		
		3rd	The governing equations (2)		Physical characteristics of the ocean, Equation of state, Thermodynamic Equations		
		4th	The governing equations (3)		Boussinesq approximation, Rossby number		
		5th	Boundary conditions between atmosphere and ocean		The Earth's heat budget, Heat, Water, and Salt Balance		
		6th	Geostrophic Flow (1)		Geostrophic Adjustment and Balance, Sverdrup balance		
		7th	Geostrophic Flow (2)		Barotropic and baroclinic flow		
		8th	midterm exam		midterm exam		
	4th Quarter	9th	Boundary layers (1)		Boundary layers in atmosphere and ocean		
		10th	Boundary layers (2)		Bottom boundary layer, Ekman transport		
		11th	Barotropic ocean circulation (1)		Ekman pumping		
		12th	Barotropic ocean circulation (2)		Western boundary currents		
		13th	Baroclinic ocean circulation (1)		physical properties of sea water, global distribution of temperature and salinity		
		14th	Baroclinic ocean circulation (2)		Quasigeostrophic theory, eddies, rossby waves		
		15th	Final presentation		Final presentation		
		16th	Review session		Review session		
Evaluation Method and Weight (%)							
	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	0	30	30	0	0	40	100
Basic Ability	0	10	10	0	0	20	40

Technical Ability	0	20	10	0	0	20	50
Interdisciplinary Ability	0	0	10	0	0	0	10