Textbook and/or texhing Marterials Instructor Microurse Objectives At the completion of this course, students will be able to: 1 understand exercited diagram and calculate quantity of each component. 2) explain behavior of dislocation and plastic deformation of steel. Rubric Multication 1 Gan calculate quantity of each component from phase diagram and understand the state of an understand the state of under the state of understand the state of an understand the state of understand the state	Toyama College			Year	Year 2020			Course Title 工業材料学 I			
Class Farmat Lecture Department of Maritime Technology Student Grade Sth	Course	Informa	tion	·	•		•				
Department of Maritime Technology Student Grade Sth Term First Semester Costack and/or Eaching Matterials	Course Co	ode	0222			Course Categor	y S	pecialize	ed / Compulsory		
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Assigned Department Objectives McC=JP#IB Teaching Method	Evaluation	า 2		Can explain fo	Can explain four strengthen		behavior and plastic				
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Theme [Lecture] - Failure of crystal structure [Lecture] - Mechanical property of materials [Lecture] - Mechanical property of materials [Lecture] - Hecture] - Hecture] - Hecture] - Failure of crystal structure [Lecture] - Hecture] - Hecture] - Hecture] - Failure of crystal structure [Lecture] - Hecture] - State diagram of alloy (all proportional solid solution) Buth [Lecture/Exercise] - State diagram of alloy (eutectic) Can understand the intervent of a metals with the knowledge of body-centered culcive intervent of a metals with the knowledge of body-centered culcive intervent of a metals with the knowledge of body-centered culcive intervent of a metals with the knowledge of body-centered culcive intervent of a metals with the knowledge of body-centered culcive intervent of a metals with the knowledge of hectors intervent of a metals with the knowledge of hectors intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of lever rule intervent of a metals with the knowledge of formation and behavior of the deformation and behavior of the def	Notice		reports Student there is course I	will be reflected in its who earned less a justifiable reaso pased on the resu an obligatory cour	n the subsequent less than 60 points manner. The subsection of th	ecture/exercise. ay be given a ch be given to those am. ense of Third gra	ance to se student	sit for ar ts who a	n extra exam upon request if ire assumed to be complete the icer (Engine) at training schools		
State	Course	Plan	T	T							
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State diagram of alloy (all proportional solid solution) State diagram of alloy (solution)			2nd					Can understand the assembly state of atoms in metals with the knowledge of body-centered cubic lattice, face-centered cubic lattice, lattice constant, density, crystal grain boundaries, etc.			
1st Quarter Semester r 1st Quarter Semester r 1st Quarter Semester Semest			3rd	[Lecture] - Failure of cryst	.ecture] Failure of crystal structure			type of solid solution, the dislocation and the			
Quarter Semeste r Can understand the mechanism of plastic deformation by stress, in particular, the concept of slip deformation and slip direction; process of dislocation and slip deformation; and critical shapped stress. Can understand the concepts of phase change and transformation point; nucleation of crystal and nucleus growth; grain size number; and grain discountion of solid solution with the knowledge of lever rule and phase rule. Can understand the concepts of phase change and transformation point; nucleation of crystal and nucleus growth; grain size number; and grain discount of the state diagram of all proportion solid solution with the knowledge of lever rule and phase rule. Can understand the concepts of elever rule and primary crystal; and elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and transformation and primary crystal; and elever to the state diagram of all proportion solid solution with the knowledge of elever rule and transformation and tran	1st Semeste r		4th								
Can understand the concepts of eutectic and primary crystal; and eutectic type phase diagram of alloy (eutectic)			5th					deformation by stress, in particular, the concepts of slip deformation and slip direction; process of dislocation and slip deformation; and critical shear			
7th			6th	- State transition	ecture] State transition of metal material			and transformation point; nucleation of crystal and nucleus growth; grain size number; and grain boundary.			
Sth [Lecture/Exercise] - State diagram of alloy (eutectic) primary crystal; and eutectic type phase diagram of alloy (eutectic) Can calculate basic elements. 2nd			7th	- State diagram	ate diagram of alloy (all proportional solid			† '			
Ourtor 9th [Mid-term exam] metals; plastic deformation and behavior of			8th					primary crystal; and eutectic type phase diagram. Can calculate basic elements.			
			9th	[Mid-term exam]			Can demonstrate knowledge of formation and metals; plastic deformation and behavior of dislocation; and interpretation of state diagrams.				

		[Answers and explanation for mid-term exam] [Confirmation of results] [Lecture] - Strengthen method of metal materials			Can understand the concepts of strain hardening, crystal grain micronizing, alloyed, precipitation strengthening.				
		11th [Lecture] - Steel as the most common mechanical material				Can classify steels with the knowledge of transformation of pure iron, magnetic transformation, ferrite and austenite.			
		12th	[Lecture] - Phase diagram o		Can understand Fe-Fe3C phase diagram, deposition, cementite and perlite in relation to organization change upon cooling.				
		[Lecture] 13th - Organization of steels and their properties - Role of carbides in steels				Can infer mechanical properties of steels from their organization and carry out relevant calculations.			
		[Lecture] 14th - Heat treatment of steels - Martensitic transformation				Can understand the techniques and effects of annealing, normalizing, tempering and the process of martensitic transformation.			
		15th [Final exam]				Can demonstrate knowledge of types and applications of strengthening materials.			
		16th	[Answers and exp [Confirmation of r [Questionnaire (E	esults1					
Evaluati	on M	ethod and \	Weight (%)						
		Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total	
Subtotal		0	0	0	0	0	0	0	
Basic Ability		0	0	0	0	0	0	0	
Technical Ability		0	0	0	0	0	0	0	
Interdiscip y Ability	olinar	0	0	0	0	0	0	0	