

Akashi College		Year	2022		Course Title	Manufacturing Engineering I
Course Information						
Course Code	4220		Course Category	Specialized / Compulsory		
Class Format	Lecture		Credits	School Credit: 1		
Department	Mechanical Engineering		Student Grade	2nd		
Term	First Semester		Classes per Week	2		
Textbook and/or Teaching Materials						
Instructor	KATOH Takahiro					
Course Objectives						
1. Understand the basics of casting and can choose the best design and machining method for a workpiece.						
2. Understand the basics of plastic working and can choose the best design and machining method for a workpiece.						
Rubric						
	Ideal Level		Standard Level		Unacceptable Level	
Achievement 1	Can establish a method for manufacturing products by casting.		Can explain the various casting methods.		Cannot explain the various casting methods.	
Achievement 2	Can establish a method for manufacturing plastic working.		Can explain the various plastic working methods.		Cannot explain the various plastic working methods.	
Assigned Department Objectives						
Teaching Method						
Outline	Can explain how to make castings, the requirements, structure and types of the molds. Can explain how to make castings in precision casting, die casting and other casting methods. Can explain the defects of castings. Can explain the characteristics of plastic working (forging, rolling, pressing, and other plastic working methods).					
Style	Classes will be held in a lecture style, and there will be exercises and assignments.					
Notice	Students are required to review what they learn and try to understand the content of the lecture, not simply memorize it. Students who miss 1/3 or more of classes will not be eligible for a passing grade.					
Characteristics of Class / Division in Learning						
<input type="checkbox"/> Active Learning		<input type="checkbox"/> Aided by ICT		<input checked="" type="checkbox"/> Applicable to Remote Class		<input type="checkbox"/> Instructor Professionally Experienced
Course Plan						
			Theme	Goals		
1st Semester	1st Quarter	1st	Outline of casting, and models (model type, and model material)	Learn about casting and models.		
		2nd	Mold I (sand mold, shell molding, special mod, and mold)	Learn about sand molds, shell molds, special molds, and molds.		
		3rd	Casting II (casting method, and forming machine)	Learn about casting plans and mold-building machines.		
		4th	Melting furnace (cupola, electric furnace, crucible furnace, and reverberatory furnace)	Learn about cupola, electric furnace, crucible furnace and reverberatory furnace.		
		5th	Defects in castings and inspection methods (defects, and inspection methods)	Learn about the defects and inspection methods of castings.		
		6th	Metal for casting (cast iron, cast steel, copper alloy, and light alloy)	Learn about cast iron, cast steel, copper alloy, and light alloy.		
		7th	Special casting method I (die casting, centrifugal casting method, vacuum degassing method, and continuous casting method)	Learn about die casting, centrifugal casting, vacuum degassing, and continuous casting.		
		8th	Summary, Midterm exam			
	2nd Quarter	9th	Overview of plastic working (What is plastic working; and characteristic of plastic working)	Learn about plastic working and its outline.		
		10th	Forging I (What is forging; hot forging, cold forging, free forging, and mold forging)	Learn about the features of forging, hot and cold forging, free forging, and mold forging.		
		11th	Forging II (forging machinery, and forging materials)	Learn about forging machinery and materials for forging.		
		12th	Rolling (What is rolling, rolling machine, rolling of steel, deforming of material, and deforming of roll)	Learn about rolling, rolling machines, rolling of steel, deforming of materials, and deforming of rolls.		
		13th	Press I (What is a press?)	Learn about the outline of press and its characteristics.		
		14th	Press II (Types of press working, and press machine)	Learn about the types of press processing and press machines.		
		15th	Other plastic working methods (explosive molding, discharge molding, electromagnetic molding, and high-speed forging), Summary	Learn about explosion molding, discharge molding, electromagnetic molding, and high-speed forging.		
		16th	Final exam			
Evaluation Method and Weight (%)						

	Examination	Report	Attendance • Behavior • Presentation	Total
Subtotal	60	30	10	100
Basic Proficiency	0	0	0	0
Specialized Proficiency	60	30	10	100
Cross Area Proficiency	0	0	0	0