

Tsuyama College		Year	2021		Course Title	Applied Machine Design
Course Information						
Course Code	0165		Course Category	Specialized / Elective		
Class Format	Lecture		Credits	Academic Credit: 2		
Department	Department of Integrated Science and Technology Advanced Science Program		Student Grade	5th		
Term	First Semester		Classes per Week	2		
Textbook and/or Teaching Materials	Textbooks : "Kikai Seizu" (Jikkyou Shuppan), Reference books : "JIS Handbook Kikai Youso" (Japanese Standards Association)					
Instructor	SHIOTA Hirohisa					
Course Objectives						
Learning purposes : Understand the drafting method and standards of each machine element, and learn this through drafting exercises. In addition, by performing a series of tasks from design calculation to production drawing creation, acquire basic design ability and CAD drawing ability						
Course Objectives : 1. To learn how to create drawings and understand the contents of drawings. 2. To understand the standards for mechanical drawing and be able to draw manufacturing drawings for mechanical parts. 3. To design the main parts of various mechanical devices and create production drawings. © 4. To understand and use the basic functions of CAD systems.						
Rubric						
	Excellent	Good	Acceptable	Not acceptable		
Achievement 1	From the assembly drawing of the mechanical device, the student can correctly imagine the structure of the device and develop it into the parts drawing.	The student can understand the contents of drawings of mechanical parts, correctly imagine the structure of those parts, and redraw them by themselves.	The student can understand the content of drawings of mechanical parts and can correctly imagine the structure of the parts from those drawings.	The student will not try to correctly understand the contents of the drawings shown or image the structure of the device.		
Achievement 2	The student can understand the standards of mechanical drafting and draw manufacturing with efficient reference to them.	The student can research and reference mechanical drafting standards on their own and draw manufacturing drawings of mechanical parts according to those standards.	The student can draw manufacturing drawings of mechanical parts based on the mechanical drawing standards shown.	The student will not try to refer to the basic standards of mechanical drawings by using reference materials.		
Achievement 3	The students can design key components of various mechanical devices and produce manufacturing drawings efficiently while working through the design process themselves.	The student can design the main parts of various types of machinery and equipment and prepare production drawings by referring to appropriate materials.	The student can design and produce manufacturing drawings for major components of various types of machinery and equipment according to the basic design procedure as directed.	The student will not try to design the main parts of various mechanical devices.		
Achievement 4	The student can understand the details of the functioning of the CAD system and use it to efficiently draw drawings of various mechanical devices.	The student can understand the basic functions of the CAD system and apply them to draw drawings of various mechanical devices.	The student can understand the basic functions of the CAD system and draw drawings of mechanical equipment.	The student will not try to understand the basic functions of the CAD system.		
Assigned Department Objectives						
Teaching Method						
Outline	General or Specialized : Specialized Field of learning : Materials, Design and Production Required, Elective, etc. : Must complete subjects Foundational academic disciplines : Engineering, /Mechanical Engineering, /Design Engineering, Machine Functional Elements, Tribology Relationship with Educational Objectives : This class is equivalent to "(3) Acquire deep foundation knowledge of the major subject area". Relationship with JABEE programs : The main goals of learning / education in this class are "(A), A-2", also "C-1" is involved. This is a course with university-equivalent content and is related to the Engineer Education Program. Course outline : In this lecture, drafting methods and standards for mechanical elements (gears, pulleys and sprockets, springs, welded joints, pipes, fittings and valves) are explained, followed by CAD drawing exercises. After that, the design calculation and the design procedure of hand-winding winches are explained, and actual design calculations and CAD drawings are made.					

Style	Course method : After explaining each machine element mainly on the blackboard, the CAD drawing exercise is carried out. After that, regarding the design calculation of the manual winch, the calculation method and procedure will be explained centering on the blackboard, and each student will create the design calculation. Next, based on this design calculation, each student will practice creating a production drawing using CAD. Grade evaluation method : Design procedure, calculation method, accuracy and validity of calculation results and appearance in design documents(30%) + General rules and standards for five drafting exercises, accuracy, adequacy and appearance of the drafting method (50%) + Efficient and correct use of the basic functions of the CAD system for drafting(20%). The distribution of grade evaluation is as described above, but if any of the above submissions have not been submitted, the evaluation score of this subject will be rejected.
Notice	Precautions on the enrollment : Students must take this class (no more than one-third of the required number of class hours missed) in order to complete the 3rd year course. Course advice : The only way to acquire the skills of reading and drawing of mechanical drawings is to make a steady effort on a daily basis. It is important to keep in mind the actual manufacturing process, and to work on the drawing while imagining the actual object. Foundational subjects : Introduction to Science and Engineering (1st year), Machine Design and Drawing(2nd), Mechanical System Engineering Experiments and Practice I (2nd) Related subjects : Mechanical System Engineering Experiments and Practice II (3rd year), Design and Machine Elements I (3rd), Mechanical System Engineering Experiments(4th), Applied Machine Design(5th) etc. Attendance advice : You can learn mechanical drawing by drawing. Sufficient review centered on drawing exercises. In addition, note that if any of the submissions described in the grade evaluation method are not submitted, the grade will be rejected. Late arrivals will be treated as late until half of each time has passed, but will be treated as absent after that.

Characteristics of Class / Division in Learning

☐ Active Learning	☐ Aided by ICT	☐ Applicable to Remote Class	☐ Instructor Professionally Experienced
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Course Plan

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1st Semester	1st Quarter	1st	Guidance Screws [Basics of screws, drafting of screws, bolts, nuts, machine screws, set screws, washers]	Understand screw as a machine element and screw drawing.
		2nd	Gears [Basics of gears, drafting of gears, spur gears, helical and bevel gears, bevel gears, worm gears]	Understand the outline of gears as mechanical elements and gear drafting.
		3rd	Pulley and sprocket (V-belt transmission, toothed belt transmission), spring drawing	Understand the outline of winding transmission as a mechanical element and the drafting of related elements.
		4th	CAD drawing exercise [spur gear 1]	Understand how to draw spur gears using CAD.
		5th	CAD drawing exercise [spur gear 2]	Understand how to draw spur gears using CAD.
		6th	CAD drawing exercise [spur gear 3]	Understand how to draw spur gears using CAD.
		7th	CAD drawing exercise [Bevel gear 1]	Understand how to draw bevel gears by CAD.
		8th	CAD drawing exercise [Bevel gear 2]	Understand how to draw bevel gears by CAD.
	2nd Quarter	9th	CAD drawing exercise [Bevel gear 3]	Understand how to draw bevel gears by CAD.
		10th	Welded joint [type of welded joint, welding symbol display], pipes / pipe fittings / valves	Understand welded joints, pipes, pipe fittings and valves as mechanical elements and their drawing.
		11th	CAD drawing exercise [Bearing with welded parts 1].	Understand how to draw welded joints by CAD.
		12th	CAD drawing exercise [Bearing with welded parts 2].	Understand how to draw welded joints by CAD.
		13th	CAD drawing exercise [Valve parts drawing 1]	Understand how to draw valves using CAD.
		14th	CAD drawing exercise [Valve parts drawing 2]	Understand how to draw valves using CAD.
		15th	1st semester final exam (Regular exam is not conducted in this subject)	
		16th	CAD drawing exercise [Valve parts drawing 3]	Understand how to draw valves using CAD.

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Exercise [Drawing]	Excercise [Design calculation]	Total
Subtotal	0	0	0	70	30	100
Basic Proficiency	0	0	0	0	0	0
Specialized Proficiency	0	0	0	50	30	80
Cross Area Proficiency	0	0	0	20	0	20