

Tsuyama College		Year	2020	Course Title	Electrical and Electronic Materials
<b>Course Information</b>					
Course Code	0110		Course Category	Specialized / Compulsory	
Class Format	Lecture		Credits	Academic Credit: 2	
Department	Department of Integrated Science and Technology Electrical and Electronic Systems Program		Student Grade	5th	
Term	Second Semester		Classes per Week	2	
Textbook and/or Teaching Materials	Textbooks :Electrical and electronic materials(Denki Shoin),"Ito Kunio and Harada Kanji , Reference books :				
Instructor	HARADA Kanji				
<b>Course Objectives</b>					
Learning purposes : By not only acquiring knowledge of materials, but also deepening the physical understanding of the physics that bring about their properties, we will fully understand the advantages and weaknesses of materials so that we can use the right materials in the right places. Course Objectives : 1. To explain physical properties such as conductivity, insulation, and magnetism. 2. To explain the knowledge of materials used in each application. 3. To explain materials while considering economic efficiency as well as physical properties.					
<b>Rubric</b>					
	Excellent	Good	Acceptable	Not acceptable	
Achievement 1	Can explain physical properties such as conductivity, semiconductors, and magnetism, and calculate problems related to those materials.	Can explain physical properties such as conductivity, semiconductors, and magnetism, and solve calculation problems for some materials.	Can explain physical properties such as conductivity, semiconductors, and magnetism, and using lecture notes can solve calculation problems related to some materials.	Student cannot explain the physical properties of conductivity, semiconductors, magnetism, etc., and even with lecture notes cannot solve calculation problems related to some materials.	
Achievement 2	Can explain the materials used in each application and calculate problems related to the materials.	Can explain the materials used in each application and solve calculation problems for some materials.	Can explain the materials used in each application, and with lecture notes can solve calculation problems related to some materials.	For some materials used in each application, it is not possible to explain the materials that take into consideration the rough physical properties.	
Achievement 3	Can explain the materials used in each application not only in terms of physical properties but also in consideration of economic efficiency.	For some materials used in each application, can roughly explain the physical properties and materials taking economic efficiency into consideration.	Can explain some materials used in each application, considering the rough physical properties.	For some materials used in each application, it is not possible to explain the materials that take into consideration the rough physical properties.	
<b>Assigned Department Objectives</b>					
3					
<b>Teaching Method</b>					
Outline	Can explain physical properties such as conductivity, semiconductors, and magnetism, and calculate problems related to those materials.				
Style	Can explain the materials used in each application and calculate problems related to the materials.				
Notice	Can explain the materials used in each application not only in terms of physical properties but also in consideration of economic efficiency.				
<b>Course Plan</b>					
			Theme	Goals	
2nd Semester	3rd Quarter	1st	Guidance Basics of materials science	Substances and materials	
		2nd	Conduction phenomenon of metal and porosity	Electron scattering and resistance	
		3rd	Volume ratio between the number of particles in the lattice and the sphere	Pore rate & volume rate	
		4th	Conductive and insulating materials	Insulation with conductor	
		5th	Resistor material	Resistors and fuses	
		6th	Basics of superconductors	Resistance and electron pair	
		7th	Applications of superconducting materials and superconducting materials	MRI and linear motor car	
		8th	2nd semester mid-term exam		
	4th Quarter	9th	Return and commentary of exam answers Liquid crystal material and Li-ion battery	LCD and battery	
		10th	Basics of magnetic materials and high magnetic permeability materials	Magnetic material and BH curve	
		11th	Permanent magnet material	Magnetic material and BH curve	
		12th	Manufacturing method of semiconductor material	Silicon purity	
		13th	How to make growth transistors and MOSFET	Bipolar transistor and NPN transistor	
		14th	Compound semiconductors and lasers	Laser oscillation conditions	

		15th	(2nd semester final exam)	
		16th	Return and commentary of exam answers	

Evaluation Method and Weight (%)

	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	80	0	0	0	20	0	100
Basic Proficiency	0	0	0	0	0	0	0
Specialized Proficiency	80	0	0	0	20	0	100
Cross Area Proficiency	0	0	0	0	0	0	0