

Toyama College		Year	2021		Course Title	Advanced Electromagnetic Waves
Course Information						
Course Code	0033		Course Category	Specialized / Elective		
Class Format	Lecture		Credits	Academic Credit: 2		
Department	Control Information Systems Engineering Course		Student Grade	Adv. 2nd		
Term	First Semester		Classes per Week	2		
Textbook and/or Teaching Materials						
Instructor	Shina Toru					
Course Objectives						
Through this course, understanding of the following will be facilitated (1) Maxwell's equations (2) Uniform plane waves in free space and dielectrics (3) Plane waves at boundaries and in dispersive media (4) Standing waves and wave reflection						
Rubric						
		Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)		
Evaluation 1		Clearly understands and has the ability to explain the Maxwell's Equations and uniform plane waves.	Ability to understand and explain the Maxwell's Equations and uniform plane waves.	Unable to understand and explain the Maxwell's Equations and uniform plane waves.		
Evaluation 2		Clearly understands the properties of plane waves and is able to explain them in detail. Has the ability to solve application problems.	Ability to explain the properties of plane waves and is able to explain them in detail. Has the ability to solve basic problems.	Unable to explain the properties of plane waves. Unable to solve basic problems.		
Evaluation 3		Clearly understands the properties of reflection and standing waves and is able to explain them in detail. Has the ability to solve application problems.	Ability to explain the properties of reflection and standing waves and is able to explain them in detail. Has the ability to solve basic problems.	Unable to explain the properties of reflection and standing waves. Unable to solve basic problems.		
Assigned Department Objectives						
ディプロマポリシー B-2 JABEE B2						
Teaching Method						
Outline	In this course, you will learn about the principles, properties and fundamental physics of electromagnetic waves, specifically: optical fiber, waveguide and distributed circuit.					
Style	For the purpose of understanding the Electromagnetic waves, lectures and exercises facilitate the learning of principles and examples.					
Notice	The recognition of credit requires 60 points or more rating. Based on the knowledge of basic electromagnetics and wave.					
Characteristics of Class / Division in Learning						
<input checked="" type="checkbox"/> Active Learning		<input checked="" type="checkbox"/> Aided by ICT		<input checked="" type="checkbox"/> Applicable to Remote Class		<input checked="" type="checkbox"/> Instructor Professionally Experienced
Course Plan						
			Theme	Goals		
1st Semester	1st Quarter	1st	Introduction of this class. Maxwell's Equations	To explain the Maxwell's Equations.		
		2nd	Uniform Plane Waves. (1) Introduction	To explain uniform plane waves in free space.		
		3rd	Uniform Plane Waves. (2) Phase Velocity, Group velocity	To explain the phase and group velocity in free space.		
		4th	Uniform Plane Waves. (3) Waves Propagation in Free Space.	To explain the wave propagation in free space.		
		5th	Loss Material	To explain plane waves in a loss material.		
		6th	Evanescent Waves.	To explain evanescent waves.		
		7th	Plane Waves at Boundaries. (1) Reflection at Normal Incidence. (a) Conductor	To explain the reflection of uniform plane waves at boundaries.		
		8th	Plane Waves at Boundaries. (1) Reflection at Normal Incidence. (b) Dielectronic	To explain the reflection of uniform plane waves at boundaries.		
	2nd Quarter	9th	Plane Waves at Boundaries. (2) Reflection at Oblique Incidence Angles. (a) Conductor	To explain the reflection of uniform plane waves at boundaries.		
		10th	Plane Waves at Boundaries. (2) Reflection at Oblique Incidence Angles. (b) Dielectronic	To explain the reflection of uniform plane waves at boundaries.		
		11th	To continue	To explain the reflection of uniform plane waves at boundaries.		
		12th	Standing Waves. (1) Impedance and Distributed Circuit	To explain Standing Waves and distributed circuits.		
		13th	Standing Waves. (2) Reflection	To explain the relationship between standing waves and reflection.		

		14th	Standing Wave. (3) Reflection Coefficient		To explain reflection coefficient at standing waves.		
		15th	Final examination		Final examination		
		16th	Summary		Summarize the study content and confirm grades.		
Evaluation Method and Weight (%)							
	Examination	Presentation	Mutual Evaluations between students	Behavior	Portfolio	Other	Total
Subtotal	60	0	0	0	0	40	100
Basic Ability	0	0	0	0	0	0	0
Technical Ability	60	0	0	0	0	40	100
Interdisciplinary Ability	0	0	0	0	0	0	0