

**Electrical circuit 4**

<b>Basic Course Information</b>			
<b>Course Number</b>	3105094	<b>Subject Category</b>	Compulsory IM
<b>Class Format</b>	Lecture	<b>Credit Type and Number of Credits</b>	1
<b>Department</b>	Mechatronics	<b>Student Category</b>	Year 4
<b>Period of Study</b>	Semester 1	<b>Classes per Week</b>	2
<b>Required Materials</b>			
<b>Instructor</b>	Waschal Pittanadiboon	Hiroshi Nishizawa	

**Course Objective**  
 In an electric circuit, the electrical phenomenon during the interval until the stabilization in a separate static state by changes from a certain static state is called the transient phenomena. In this course, students learn about transient phenomena in electric circuits. Differential equation solving methods are used.

Evaluation/Rubric	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Transient phenomenon in RL Series Circuits	Demonstrates very good knowledge of Transient phenomenon in RL Series Circuits	Demonstrates good knowledge of Transient phenomenon in RL Series Circuits	Lacks the appropriate knowledge of Transient phenomenon in RL Series Circuits
Transient phenomenon in RC Series Circuits	Demonstrates very good knowledge of Transient phenomenon in RC Series Circuits	Demonstrates good knowledge of Transient phenomenon in RC Series Circuits	Lacks the appropriate knowledge of Transient phenomenon in RC Series Circuits
Transient phenomenon in RLC Series Circuits	Demonstrates very good knowledge of Transient phenomenon in RLC Series Circuits	Demonstrates good knowledge of Transient phenomenon in RLC Series Circuits	Lacks the appropriate knowledge of Transient phenomenon in RLC Series Circuits

**Relationship with Learning Outcomes**  
**M12 Ability to design, propose and develop electrical and electronic systems for robotics/ mechatronic systems**  
**Please change**  
**Please change**

**Teaching Method**  
**Outline:** Repeat of Explanation/Draft  
**Class Format:** Lecture and Draft  
**Please Note:** Students are required to ask any questions after sufficient self-learning.

Course Plan	Contents and Method of Course	Goals	Related MCO
Semester 1			
1st week	Introduction of capacitors and inductors in series or in parallel circuits	Explaining Introduction of capacitors and inductors in series or in parallel circuits	V-C 1-10 V-C 2-31 V-C 2-32 V-C 2-33 V-C 1-24
2nd week	Transient phenomenon in RC series circuits (DC 1)	Explaining Transient phenomenon in RC series circuits (DC 1)	V-C 1-24
3rd week	Transient phenomenon in RC series circuits (DC 2)	Explaining Transient phenomenon in RC series circuits (DC 2)	V-C 1-24
4th week	Transient phenomenon in RL series circuits (DC 1)	Explaining Transient phenomenon in RL series circuits (DC 1)	V-C 1-24
5th week	Transient phenomenon in RL series circuits (DC 2)	Explaining Transient phenomenon in RL series circuits (DC 2)	V-C 1-24
6th week	Transient phenomenon in RLC series circuits (DC 1)	Explaining Transient phenomenon in RLC series circuits (DC 1)	V-C 1-24
7th week	Transient phenomenon in RLC series circuits (DC 2)	Explaining Transient phenomenon in RLC series circuits (DC 2)	V-C 1-24
8th week	Review before Midterm Examination	Explaining Review before Midterm Examination	
9th week	Midterm Examination	Test student understanding.	
10th week	Return Exam Papers and Feedback	Explaining Return Exam Papers and Feedback	
11th week	Friday class	Friday class	
12th week	Transient phenomenon in RLC series circuits (DC 3)	Explaining Transient phenomenon in RLC series circuits (DC 3)	V-C 1-24
13th week	Transient phenomenon in RC Series Circuits (AC)	Explaining Transient phenomenon in RC Series Circuits (AC)	V-C 1-12 V-C 1-13
14th week	Transient phenomenon in RL Series Circuits (AC)	Explaining Transient phenomenon in RL Series Circuits (AC)	V-C 1-12 V-C 1-13
15th week	Transient phenomenon in RLC Series Circuits (AC)	Explaining Transient phenomenon in RLC Series Circuits (AC)	V-C 1-12 V-C 1-13
16th week	Basic Three-phase.	Understand the basic three phase, and can analyze the three phase of delta- $\omega$ and wye- $\omega$ .	V-C 5-63 V-C 5-64 V-C 5-65 V-C 5-67
17th week	Three phase for AC motor applications.	Analyze and evaluate the AC power of three phase induction motors.	
18th week	Review before Final Examination	Explaining Review before Final Examination	
19th week	Final Examination	Test student understanding.	
20th week	Final Examination	Test student understanding.	
21st week	Return Exam Papers and Feedback	Review and summarize learning	

Do not

	Examination	Quiz	Midterm Examinations between students	Report	Portfolio	Other
Basic Ability	D	D	D			
Technical Ability	D	D	D			
Interdisciplinary Ability	D	D	D			