Electrical Circuits and Electronics 1

Basic Course Information

Course Number	02005126	**Subject Category**	Compulsory (C)
Class Format	Lecture	**Credit Type and Number of Credits**	1
Department	Computer	**Student Category**	Year 2
Period of Study	Semester 1	**Classes per Week**	1
Required Materials	Internet connection is required		
Instructor	Hitoshi Nishizawa	Thanyawarat Pawasopon	

Course Objective

This course provides students with basic knowledge of Electrical Circuits and Electronics. The topic covered in this course: Basics of analog circuits, concepts of voltage, current, power, resistance capacitance and inductance, and circuit analysis techniques.

Evaluation (Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Ability to calculate DC circuits	Can analyze complex DC circuits and calculate all the related parameters.	Can analyze DC circuits with plural elements and calculate some parameters.	Cannot analyze or calculate simple DC circuits.
Ability to calculate simple AC circuits	Can analyze AC circuits with plural elements and calculate all the related parameters.	Can analyze simple AC circuits and calculate some parameters.	Cannot analyze or calculate any simple AC circuits.
Ability to apply knowladge to the solution of real problems	Can clearly identify which methods are better for each problem.	Can solve some real problem by using accustomed method.	Cannot apply knowledge to solve any real problem.
Ability to design a easy circuit for basic applications, such as DC meter, voltage divider and current divider	Understand well how to design a circuit correctly for basic applications.	Can explain how to design an easy circuit for basic applications.	Can not explain how to design any basic circuits.

Relationship with Learning Outcomes
C(1) Ability to operate and administer the computer software and hardware
Please change
Please change

Teaching Method

Outline:	Lecture and Practice
Class Format:	Lecture, Practice and Homework Assignments
Please Note :	Students are expected to ask any questions after sufficient self-learning.

Course Plan

Semester 1	Contents and Method of Course	Goals	Related MCC
1st week	Charge, current, voltage, resistor, power, energy, inductor, capacitor •	Can identify the parameters for electrical circuits and recognize the property of resistors, inductors, and capacitors.	V-C 1 1
2nd week	Ohm's law, series resistance, parallel resistance, voltage and current divider •	Able to calculate values of electrical parameters of resistance circuits.	V-C 1 2 V-C 1 4 IV-C 1 6
3rd week	Kirchhoff's law (KVL, KCL), combined resistor circuit, and circuit network •	Able to apply KVL and KCL to solve basic circuit problems.	V-C 1 3 IV-C 1 5
4th week	Y-Delta, Delta-Y transformations and Wheatstone bridge circuit •	Able to use Y-Delta and Delta-Y transformations and deduce the equivalent circuit of a Wheatstone bridge circuit.	V-C 1 5 IV-C 1 7
5th week	National holiday •		
6th week	Mesh and nodal analysis, superposition theorem •	Able to identify the best method to calculate I, V, P of complecated circuits.	IV-C 1 8
7th week	Ho - Thevenin's theorem, Norton's theorem, and maximum power transfer •	Can transform a complex circuit into the equivalent circuit by using Ho - Thevenin's theorem and Norton's theorem. Can find a particular resistance value for the maximum power.	V-C 1 6 V-C 1 19
8th week	Preparing for Mid-term examination •	Review problems for the mid term examination.	
9th week	Mid-term examination •	Can slove problems at the mid-term examination.	
10th week	Midterm exam week •		
11th week	Return exam papers and feedback, review of radian	Review and summarize the learning.	
12th week	Sinusoidal waveform •	Able to identify a sinusoid's amplitude, frequency, and phase angle.	V-C 1 7
13th week	Voltage-current relationship over a capacitor and an inductor in AC circuits •	Able to understand the mechanism of phase shift over a capacitor and an inductor.	V-C 1 10
14th week	Phasor converting •	Able to convert between sinusoids and phasor expressions.	V-C 1 9
15th week	National holiday •		
16th week	Impedance and Admittance •	Able to use complex numbers to express impedance and admittance.	IV-C 1 9 V-C 1 13
17th week	AC circuit analysis (1) •	Can solve simple circuit problems in AC.	V-C 1 12
18th week	AC circuit analysis (2) •	Can solve simple circuit problems in AC.	V-C 1 12
19th week	Preparing for final examination •	Review related circuit problems for the final examination.	
20th week	Final Examination •	Can slove problems at the final examination.	

Do not

	Examination	**Quiz**	**Mutual Evaluations between students**	**Report**	**Portfolio**	**Other**
Basic Ability	60	40				
Technical Ability						
Interdisciplinary Ability						