

# Electronics

Basic Course Information			
<b>Course Number</b>	0105143	<b>Subject Category</b>	Elective III
<b>Class Format</b>	Lecture	<b>Credit Type and Number of Credits</b>	1
<b>Department</b>	Mechatronics	<b>Student Category</b>	Year 5
<b>Period of Study</b>	Semester 2	<b>Classes per Week</b>	1
<b>Required Materials</b>	TBA		
<b>Instructor</b>	Hitoshi Nishizawa / Jirapat Anurathinuratt		

**Course Objective**  
 The course provides students with knowledge of electronics for physics in semiconductor and advanced devices. The topics covered in this course: Wide Band Gap Devices, Terahertz and Millimeter Wave Devices, Silicon and SiGe Devices, Nano electronics, and Imaseg Devices.

Evaluation/Rubric	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Physics of wide band gap devices	Able to describe how wide band gap devices work in detail.	Able to describe how wide band gap devices work.	Cannot describe how wide band gap devices work.
Physics of High frequency devices	Able to describe how High frequency devices work in detail.	Able to describe how High frequency devices work.	Cannot describe how High frequency devices work.
Physics of power semiconductor devices	Able to describe how power semiconductor devices work in detail.	Able to describe how power semiconductor devices work.	Cannot describe how power semiconductor devices work.

**Relationships with Learning Outcomes**

**M(2) Ability to design, propose and develop electrical and electronic systems for robotics/ mechatronic systems**

**Please change**  
**Please change**

Teaching Method	
<b>Outline</b>	Lecture and group work
<b>Class Format</b>	Lecture and group work
<b>Please Note</b> :	Students are required to ask any questions after sufficient self-learning

Semester 2	Contents and Method of Course	Goals	Related MCC
1st Week	Operation of power semiconductor devices	Can explain how power semiconductor devices operate.	
2nd Week	Applications and classification of power semiconductors	Can explain how power semiconductors are used in the society.	
3rd Week	Power semiconductor wafers and manufacturing processes	Can explain how power semiconductor are manufactured.	
4th Week	Development of silicon power semiconductors, IGBT	Can explain the recent technology trend of developing silicon-based power semiconductor devices.	
5th Week	Wide band gap devices using SiC and GaN	Can explain the benefits and features of wide band gap devices using SiC and GaN.	
6th Week	National Holiday *		
7th Week	Power semiconductors and the decarbonization era	Can explain how power semiconductor devices contribute to decarbonization.	
8th Week	Preparing for Mid-term examination *	Review problems for the mid-term examination.	
9th Week	National Holiday *		
10th Week	Mid-term examination	Can solve problems at the mid-term examination.	
11th Week	Return exam papers and feedback * Imaseg devices, CCD	Review and summarize the learning, can explain the how CCD and other image devices work.	
12th Week	Terahertz technologies	Can explain the outline of terahertz technologies.	
13th Week	SiGe technology	Can explain the outline of SiGe technology.	
14th Week	Nanoelectronics	Can explain the outline of nanoelectronics.	
15th Week	Solid electrolyte devices	Can explain how solid electrolyte devices work.	
16th Week	Solid-state gas sensors	Can explain an application of solid-state gas sensors.	
17th Week	National Holiday *		
18th Week	Preparing for final examination	Review related circuit problems for the final examination.	
19th Week	Final Examination *	Can solve problems at the final examination.	
20th Week	Return exam papers and feedback	Review and summarize the learning.	

Do not

Examination	Quiz	Mutual Evaluation between students	Report	Portfolio	Other
Basic Ability			50	50	
Technical Ability					
Interpersonal Ability					