Science 3 (Physics)

Basic Course Information

Course Number	03005021	Subject Category	Compulsory(G)
Class Format	Lecture	Credit Type and Number of Credits	1
Department	Electrical and Electronics	Student Category	Year 2
Period of Study	Semester 1	Classes per Week	2
Required Materials	KOSEN Textbook Series Physics Volume 2, Heat, Electricity and Magnetism, and Atoms, H. I. Ishii et al., Mokillp Publishing Co., Ltd. ISBN978-4-627-15521-3		
Instructor	Anirut Phriksee		

Course Objective

There are various types of engineering problems that require a good knowledge and application of physics.
Physics 3 is a continuation of Physics 2. It is the physics part of Science 3. This course provides students with basic knowledge and concepts of physics in introduction of fluid mechanics, and introduction of thermodynamics (temperature and heat : specific heat/work and heat: thermodynamic cycles/heat engine).
The exercise and homework are designed to help the students to develop knowledge, problem solving skills and

Evaluation(Rubric)	Ideal Level of Achievement (Very Good)	Standard Level of Achievement (Good)	Unacceptable Level of Achievement (Fail)
Understanding concepts of physics and their	Ability to correctly understand and explain concepts in Physics and connect with real life experiences.	Ability to fairly understand and explain concepts in Physics and connect with real life experiences but with some mistakes	Lacks the appropriate knowledge and understanding of concepts in Physics. Weak connection among these concepts
Mastering mathematical and graphical expressions skills.	Ability to describe equations and show good understanding by using graphs with necessary details and vice versa	Ability to describe equations and show understanding by using graphs and vice versa but not in details	Equations are limited or inaccurate. Graphs are incomplete or absent.
Problem Solving	Ability to provide a clear and logical expression from general concepts/equations to solve specific problems with different conditions. All final numerical answers are correct with appropriate units and calculations	Ability to provide some logical expression from general concepts/equations to solve specific problems with different conditions but with major mistakes in calculations, algebraic, or units.	Provide an unclear logical progression or solution which is very difficult to follow. Major algebraic and/or other mathematical mistakes in solution.

Relationship with Learning Outcomes

G(1) Wide knowledge on Science and Engineering and practical ability to apply them to solve problems in the society.

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Teaching Method

Outline:	Students will study basic concepts and principles of fluid mechanics and
Class Format:	Lecture/exercise, and Mini-Lab, and Demonstration.
Please Note :	The student is requested to keep photo copies or files of all submitted material to

Course Plan

Semester 1	Contents and Method of Course	Goals	Related MCC
1st week	Introduction and Fluid mechanics 1	Guidance and appreciation of pressure, buoyant forces, and Archimedes' principle	
2nd week	Fluid mechanics 2	Appreciation of fluid dynamics, Bernoulli's equation, flows of viscous fluid in pipes, and Mini-Lab.	
3rd week	Elasticity	Understanding elastic properties of solids.	
4th week	Introduction to thermodynamics	Checking what students already learned about thermodynamics and understand what they will learn in the course	II-A 1 42 / II-A 1 43
5th week	Temperature and Heat (1) Specific Heat and Heat Capacity	Perform calculations using heat capacity and specific heat of objects. Write a formula representing the law of conservation of heat then calculate heat capacity and specific heat.	II-A 1 44 / II-A 1 45 / II-A 1 46 / II-A 1 50
6th week	Temperature and Heat (2) Thermal expansion and Temperature measurement	Appreciation of concepts of temperature and heat about thermal expansion and temperature measurement	
7th week	Temperature and Heat (3) Change of State and Latent Heat	Appreciation of concepts of temperature and heat about change of state and latent heat	
8th week	Wrap-up of 1st half of semester (Review)	Review and summarize learning	
9th week	Midterm Examination	For week 1-8	
10th week	Return Midterm Exam Papers and Feedback	Review learning	
11th week	Gas laws	Perform calculations relating to pressure, temperature and volume of gas using Gas laws and the equation of state for the ideal gas, and Mini-Lab II.	II-A 1 47 / II-B 1 6
12th week	Kinetic energy of gas	Explain the kinetic energy of a gas by utilizing the relevant principles associated with its molecular motion and temperature.	
13th week	Internal energy of gas	Explain the internal energy of gas.	II-A 1 48
14th week	First law of thermodynamics and thermodynamic process (1)	Explain the first law of thermodynamics, as well as isochoric change, isobaric change, isothermal change and adiabatic change.	II-A 1 49 / II-A 1 51
15th week	Thermodynamics process (2) and Thermal cycle	Continuation from the previous week and introduce of thermal cycles	II-A 1 49
16th week	Heat engine (1)	Perform calculations relating to thermal efficiency of heat engines.	II-A 1 52
17th week	Heat engine (2)	Perform calculations relating to thermal efficiency of heat engines.	II-A 1 52
18th week	Wrap-up of 2nd half of semester (Review)	Review and summarize learning	
19th week	Final Examination	For week 11-18	
20th week	Return Exam Papers and Feedback, and Special sessions	Review and summarize learning	

Do not

	Examination	Quiz	Mutual Evaluations between students	Report	Portfolio	Other
Basic Ability	60	30		10		
Technical Ability						
Interdisciplinary Ability						