TQF 3 Course Specifications

Section 1 General Information

1. Course code and course title

Thai ICPY102 ฟิสิกส์ ๒

English ICPY102 Physics II

2. Number of credits 4 (4-0-8)
3. Program and type of subject
   - 3.1 Program Undergraduate Degree (International Program)
   - 3.2 Type of Subject Required Major Class
4. Course Coordinator and Course Lecturer
   - 4.1 Course Coordinator Tara Chalermsongsak, Science Division, Mahidol University International College, tara.cha@mahidol.ac.th
   - 4.2 Course Lecturer Withoon Chuenvajirasiri, Withoon.Chu@mahidol.ac.th
5. Trimester/ Year of Study
   - 5.1 Trimester All trimesters (including summer session) / for all students in all International College Undergraduate Programs
   - 5.2 Course Capacity Approximately 30 students
6. Pre-requisite ICPY 101 Physics I
7. Co-requisites N/A
8. Venue of Study Mahidol University, Salaya campus
9. Date of Latest Revision January 24, 2018

Section 2 Goals and Objectives

1. Course Goals

Students should be able to

Students should be able to describe kinetic theory, heat, temperature, thermodynamics, oscillation, waves. Electricity and magnetisms.

2. Objectives of Course Development/Revision

2.1 Course Objectives

1. To revise course contents
2. To include a well-defined course-level learning Outcomes.

2.2 Course-level Learning Outcomes: CLOs

By the end of the course, students will be able to (CLOs)

1. CLO1: Understand the kinetic theory and its relation to heat and temperature.
2. CLO2: Understand a small oscillations and its properties, namely, amplitude and frequency.
3. CLO3: Understand some basic wave phenomena, reflection, refraction, interference and diffraction in a simple system.
4. CLO4 Understand a basic concept of charge, current, electric field and Voltage,

Magnetic field and how they relate in Coulomb laws and Ampere's law.

Section 3 Course Management

1. Course Description

   การสั่นและคลื่น แสงและเสียง อุณหพลศาสตร์ ไฟฟ้าและแม่เหล็ก ฟิสิกส์ยุคใหม่

   Oscillations and wave; light and sound; Thermodynamics; electricity and magnetism; Modern Physics

2. Credit hours per trimester

Lecture (Hour(s))	Laboratory/field trip/internship (Hour(s))	Self-study (Hour(s))
48	0	96

3. Number of hours that the lecturer provides individual counseling and guidance.
   2 hour/week

Section 4 Development of Students' Learning Outcome

1. Short summary on the knowledge or skills that the course intends to develop in students (CLOs)

   By the end of the course, students will be able to

   1. CLO1: Understand the kinetic theory and its relation to heat and temperature.
   2. CLO2: Understand a small oscillations and its properties, namely, amplitude and frequency.
   3. CLO3: Understand some basic wave phenomena, reflection, refraction, interference and diffraction in a simple system.
   4. CLO4 Understand a basic concept of charge, current, electric field and Voltage, Magnetic field and how they relate in Coulomb laws and Ampere's law.

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2. Teaching methods for developing the knowledge or skills specified in item 1 and evaluation methods of the course learning outcomes

Course CLO	Teaching methods	Evaluation Methods
CLO 1	Lecture, class discussion	Assignments, written examination
CLO 2	Lecture, class discussion	Assignments, written examination
CLO 3	Lecture, class discussion	Assignments, written examination
CLO 4	Lecture, class discussion	Assignments, written examination

Section 5 Teaching and Evaluation Plans

1. Teaching plan

Week	Topic	Number of Hours		Teaching Activities/ Media	Lecturer
		Lecture Hours	Lab/ Field Trip/ Internship Hours		
1	Systems, process, thermal equilibrium. Heat and heat transfer.	4	0	Lecture, real-life examples.	Withoon V.
2	Internal energy and work. The first law of thermodynamics	4	0		
3	The second law of thermodynamics	4	0		
4	Some applications in thermodynamics.	4	0		
5	Waves and the basic properties of waves.	4	0		
6	Sound wave	4	0		
7	Electromagnetic wave	4	0		
8	Electricity.	4	0		
9	Direct current and dc circuits, applications	4	0		
10	Magnetism, magnetic force and field.	4	0		
11	Alternating currents	4	0		
12	Some basic ac instruments and their applications	4	0		
	Total	48	0		

2. Plan for Assessing Course Learning Outcomes

2.1 Assessing and Evaluating Learning Achievement

a. Formative Assessment

1. Class discussion
2. Reflective question
3. In-class examples

b. Summative Assessment

(1) Tools and Percentage Weight in Assessment and Evaluation

Learning Outcomes	Assessment Methods	Assessment Ratio (percentage)	
CLO1: Understand the kinetic theory and its relation to heat and temperature.	Exam	10	25
	Assignment	15	
CLO2: Understand a small oscillations and its properties, namely, amplitude and frequency.	Exam	15	25
	Assignment	10	
CLO3: Understand some basic wave phenomena, reflection, refraction, interference and diffraction in a simple system.	Exam	10	25
	Assignment	15	
CLO4 Understand a basic concept of charge, current, electric field and Voltage, Magnetic field and how they relate in Coulomb laws and Ampere's law.	Exam	10	25
	Assignment	15	
Total			100

(2) Grading System

Grade	Achievement	Final Score (% range)	GPA
A	Excellent	90-100	4.0
B+	Very good	85-89	3.5
B	Good	80-84	3.0
C+	Fairly good	75-79	2.5
C	Fair	70-74	2.0

D+	Poor	65-69	1.5
D	Very poor	60-64	1.0
F	Fail	Less than 60	0.0

(3) Re-examination (If course lecturer allows to have re-examination)
N/A - (Not applicable with MUIC)

3. Student Appeals N/A

Section 6 Teaching Materials and Resources

1. Textbooks and/or other documents/materials
    1. Serway, and Jewett, Physics for Scientist and Engineer, Brooks Cole.
    2. Halliday, Resnick, Walker, Fundamentals of Physics, Wiley
2. Recommended textbooks and/or other documents/materials
    As posted on the course's e-learning site
3. Other Resources (If any)
    As posted on the course's e-learning site

Section 7 Evaluation and Improvement of Course Management

1. Strategies for effective course evaluation by students
    1.1. Discussion between course instructor and students
    1.2. Questionnaire from students.
2. Evaluation strategies in teaching methods
    2.1. Evaluation of effectiveness based on student evaluation scores and comments
    2.2. Evaluation through peer observations by co-instructor or other Division faculty
3. Improvement of teaching methods
    3.1. Adjustments based on student feedback, personal observations, comments from peer observations and discussions with supervisor and/or other Division faculty in one-on-one and/or group meetings as specified by MUIC guidelines.
4. Verification of students' learning outcomes.
    4.1. Verification through student performance on assessments based on MUIC/Division standards
5. Review and improvement for better outcome
    5.1. Course instructors (and coordinator/supervisor) will meet to discuss results of student evaluations and student performance based on learning outcomes in order to identify point for improvement
    5.2 Strategy for improvement set according to MUIC/Division guidelines

Appendix
Alignment between Course learning outcomes and Program learning outcome

Table 1 The relationship between course and Program Learning Outcomes (PLOs)

Physics II	Program Learning Outcomes (PLOs)				
	PLO1	PLO2	PLO3	PLO4	PLO5
ICPY 102	I				

Table 1 The relationship between CLOs and Program LOs (Number in table = sub Los)

CLOs	Physics Program's Learning Outcomes				
	PLO1	PLO2	PLO3	PLO4	PLO5
CLO1: Understand the kinetic theory and its relation to heat and temperature.	1.1				
CLO2: Understand a small oscillations and its properties, namely, amplitude and frequency.	1.4				
CLO3: Understand some basic wave phenomena, reflection, refraction, interference and diffraction in a simple system.	1.4				
CLO4 Understand a basic concept of charge, current, electric field and Voltage, Magnetic field and how they relate in Coulomb laws and Ampere's law.	1.3				

Table 2. Description of Program Los and Sub Los of the program

LOs	SUb LOs
1. Apply quantitative skills both analytical and computational to solve physics problems in various subject.	1. Applying Classical Mechanics knowledge to solve relevant problems 2. Explaining motion and behavior of small object i.e. electrons. 3. Using Electro-Magneto static to solve problems 4. Explaining wave and oscillations

	phenomena. 5. Solving Thermodynamics Problems. 6. Understand Lorentz transformation for velocity, length, time and momentum
2) Appraise Physics information critically	1. Do order of magnitude estimation for daily life situations. 2. Analyze relevant data in a meaningful and effective way. 3. Critique and discuss on contemporary research publication. 4. Integrate knowledge from other scientific disciplines to evaluate the research questions.
3) Demonstrate proficiency in oral and written communication of scientific concepts	1. Be able to analyze data and display result in lab reports appropriately 2. Demonstrate proficiency in oral presentation.
4) Apply scientific integrity and professionalism.	1. Report experimental result and explain the discrepancy in the result sincerely and scientifically. 2. Execute experimental work using robust techniques 3. Work as a team with professional attitude.
5) Conduct research or experiment to answer Physics problems quantitatively.	1. Apply numerical method to solve scientific problems 2. Research or do experiment to answer a scientific problem 3. Innovate product that generates a solution for a problem.