SAMSEN WITTAYALAI SCHOOL
ENGLISH PROGRAM

COURSE OUTLINE

Subject: Physics (SC33201) **Course Classification**: ☐ Foundation ☑ Additional
Learning Period: 4 Periods/Week **Credit Unit**: 2
Grade Level: Mattayomsuksa 6 (Grade 6) **Semester** 1, **Academic Year** 2022
Learning Area: Science and technology **Samsenwittayalai School** English Program
Teacher: Dr. Songsak Phonghirun
Dr. Kem Pumsa-ard

I. COURSE DESCRIPTION

Study of fundamental concepts of Thermal Physics, such as Temperature and Thermal Equilibrium, Thermal Expansion, Quantity of Heat, Phase Changes, Calorimetry, Heat Transfer, The Mole and Avogadro's Number, Equations of State, Kinetic Theory and Ideal Gas, Heat Capacities, Property of an Ideal Gas.

In addition, the concepts and applications of elasticity of materials and fluid dynamics are studied, such as the stress, strain and the Young's modulus, gauge pressure, absolute pressure, atmospheric pressure, Pascal's law, Archimedes principle, buoyant force, surface tension, viscosity, ideal fluid, continuity equation and the Bernoulli's equation.

By using the scientific processes, seeking knowledge, searching data, investigating, analyzing, comparing, explaining, discussing and conclude.

For improving the scientific knowledge and understanding so that the students can make use of the knowledge to make decision, develop scientific skill including the 21st century skills in information technology, critical thinking and problem–solving and communicating. They can also communicate the knowledge and can use the knowledge in every day's life, leading to scientific mind, ethics, virtues and appropriate attitudes.

II. LEARNING OUTCOMES

1. Learners' reading, analytical thinking and writing skills meet the criteria prescribed by the respective educational institutions.
2. Learners' desirable characteristics meet the criteria prescribed by the respective educational institutions.
3. Explain the relationship between temperature scales, heat and internal energy, methods of heat transfer.
4. Explain principles of thermal expansion, stress, strain and Young's modulus.
5. Explain and calculate gauge pressure, absolute pressure and atmospheric pressure. Explain the principle of a barometer, manometer and hydraulic systems
6. Explain the ideal gas law and its terms.

7. Explain ideal gas model, kinetic theory of an ideal gas, root-mean-square speed and other parameters.
8. Explain and calculate work done by gas, the relationship between heat and internal energy.
9. Conduct experiment, describe and calculate the Buoyant force exerted by a fluid.
10. Conduct experiment, describe and calculate the surface tension and viscosity of a liquid.
11. Describe and calculate the related quantities in the study of the ideal fluid, the continuity equation and the Bernoulli equation. Explain the working principle of devices based on the continuity equation and the Bernoulli equation.

III. TENTATIVE COURSE OUTLINE

Week	Topics / Contents	Learning outcome	Period(s)
1	Temperature and Thermal Equilibrium (Dr.Songsak) Elasticity, stress and strain (Dr.Kem)	1,2,3 1, 2, 4	2 2
2	Thermal Expansion (Dr.Songsak) Young's modulus (Dr.Kem)	1,2,3,4 1, 2, 4	2 2
3-4	Quantity of Heat (Dr.Songsak) Gauge pressure, absolute pressure and atmospheric pressure (Dr.Kem)	1,2,3,4 1, 2, 5	4 4
5	**Formative Assessment 1**	1,2,3,4,5	2
6-7	Phase Changes and Calorimetry (Dr.Songsak) Manometer, barometer, Pascal's law (Dr.Kem)	1,2,3,5 1, 2, 5	4 4
8-9	Heat Transfer (Dr.Songsak) Archimedes principle, buoyant force (Dr.Kem)	1,2,3,5 1, 2, 9	4 4
10	**Mid-term Examination**	1,2,3,4,5,9	2
11	The Mole and Avogadro's Number (Dr.Songsak) Surface tension (Dr.Kem)	1,2,5,6 1, 2, 10	2 2
12-13	Equations of State (Dr.Songsak) Viscosity (Dr.Kem)	1,2,5,6 1, 2, 10	4 4
14	**Formative Assessment 2**	1,2,5,6,10	2
15-16	Kinetic Theory and Ideal Gas (Dr.Songsak) Ideal fluid and continuity equation (Dr.Kem)	1,2,5,6,7 1, 2, 11	4 4
17	Heat Capacities (Dr.Songsak) Bernoulli equation (Dr.Kem)	1,2,6,7 1, 2, 11	2 2
18-19	Property of an Ideal Gas (Dr.Songsak) Applications of continuity equation and Bernoulli equation (Dr.Kem)	1,2,6,7,8 1, 2, 11	4 4
20	**Final Examination**	1,2,5,6,7,8, 10,11	2

IV. Teaching Methods and Management

☑ Experiment	☑ Lecture/Discussion	☑ Group work
☑ Individual work	☐ Game	☐ Song
☑ Self-learning	☑ Demonstration	☐ Role play
☐ Project	☐ Experience	☐ ICT
☐ Local Wisdom based	☐ Others	

V. Teaching Materials/ Supplements

☑ Handouts	☑ Worksheets	☐ Teacher's text book
☑ Graphs/ Diagrams	☐ Maps	☑ Pictures
☐ Samples/ Models	☐ Exercise s	

☐ Commercial Text Book ☐ DVD/VCD ☐ Website ☐ Others

VI. Assessment and Evaluation

Indicator / Learning Outcome Score from SGS	**Formative I**				**Midterm**	**Formative II**						**Final**
	1	2	3	4		10	11	12	13	14	15	
Total score	**15**				**15**	**10**	**10**	**10**	**10**			**30**
Learners' reading, analytical thinking						10						
Learners' desirable characteristics							10					
Learning Outcome 3	4				4							
Learning Outcome 4	4				4							
Learning Outcome 5	4				4							
Learning Outcome 6								3				5
Learning Outcome 7								3				5
Learning Outcome 8								4				5
Learning Outcome 9	3				3				3			5
Learning Outcome 10									3			5
Learning Outcome 11									4			5
Total score (100)	**15**				**15**	**40**						**30**

VII. Assignment

SGS No.	Score (points)	Assignment	Deadline	Type			Remark
				Test	Individual	Group	
1	5	Worksheet	Entire semester		✓		
	10	Quiz/test	Week 5	✓			
Midterm	15	Midterm Exam	Week 10	✓			
10	10	Learners' reading, analytical thinking and writing	Entire semester			✓	
11	10	Learners' desirable characteristics	Entire semester		✓		
12	10	Group work	Week 14			✓	
13	10	Homework	Entire semester		✓		
Final	30	Final Exam	Week 20	✓			
Total	100						

Note: 1. Assignment are quiz, homework, exercise report or project etc.
2. The details in assessment and evaluation are tentative.