


 FPMIPA UPI	SILABUS	No. Dok. : FPMIPA-SE-SL-17
	Heat and Matters SE 404- 3 Credits 4th Semester IPSE	Revisi : 00 Tanggal : 1 Oktober 2010 Halaman : 1 dari 4
Dibuat Oleh :	Diperiksa Oleh :	Disetujui Oleh :
 (Dr. Lilik Hasanah)	 (Dr. Diana R.)	 (Dr. phil. Ari Widodo)


Description

Heat and Matters is a compulsory course and aimed to provide student competencies on physics especially on Heat and Matters concept. It is expected that students are not only able to understand fundamental heat and matters both are concepts and basic practices but also expand and apply to shape their critical thinking in scientific purposes. The course content consist of: physics overview, heat and temperature, heat transfer, kinetic theory and the ideal gas law, and thermodynamics. Inquiry and concept approaches (and more suitable one) are applied with individual and group assignment, class-lab reports, middle and final test are used as evaluation instruments. The references such as Physics by Cutnell , Thermodynamics by Cengel and Physics by Giancoli are used, with others references as enrichment.

Syllabus

1. Course Identity

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|-------------------|--|
| a. Name | : Heat and Matters |
| b. Code | : SE 404 |
| c. Credit (s) | : 3 |
| d. Grade | : 2 nd grade, on 1 st semester |
| e. Classification | : CSC (Concentration Science Courses) |
| f. Program | : IPSE-FPMIPA UPI/ S-1 |
| g. Statue | : compulsory |
| h. prerequisite | : - |
| i. Lecturer | : Drs. Saeful Karim, M.Si.
Dr. Lilik Hasanah, M.Si. |

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2. Goal

Soon after completed the class, it is expected students should be able to understand Heat and Matters Concept, both are concepts and basic practices, and also to expand and apply it to shape their critical thinking in scientific purposes.

3. Content


The courses will explore the basic principles about: physics overview (differential and its operation), heat and temperature (common temperature scales, Kelvin temperature scale, thermometers, Linear and Volume Thermal Expansion, Heat and Internal Energy, specific heat capacity, latent heat, phases of matter and humidity) heat transfer (convection, conduction, radiation, and its application), kinetic theory (Molecular mass, the mole and Avogadro's number, The Ideal gas law, Kinetic Theory of Gases, Diffusion and its calculations) and thermodynamics (Systems and its surrounding, The Zeroth Law of Thermodynamics, The First Law of Thermodynamics, Thermal Processes, Thermal Processes using Gas Ideal, Specific Heat Capacities, The Second Law of Thermodynamics, Heat Engine, Carnot Principles and The Carnot Engine, Air Conditioners and Refrigerators, Entropy, The Third Law of Thermodynamics and its Calculations)

4. Learning Activities

- Method(s) : Thematically classroom-lab activities, demonstration will be applied to enrich expository methods, meaningful speech, focused-group discussion.
- Approach(s) : inquiry and constructivism approaches
- Assignment : individual and group reports
- Media : learning software, power point slides by LCD, lab-class activities by lab equipment and demonstration apparatus.


5. Assessment

- Individual and group assignment
- Class-lab reports
- Middle and final test
- Lecturer's policy

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6. Meeting's Agenda:

- 1st Meeting : Introduction on Heat and Matters, Desk and Syllabi discussion, differential and its operation
- 2nd Meeting : Heat and Temperature : common temperature scales, Kelvin temperature scale, thermometers.
- 3rd Meeting : Heat and Temperature : Linear and Volume Thermal Expansion, Heat and Internal Energy.
- 4th Meeting : Heat and Temperature : specific heat capacity, latent heat, phases of matter and humidity.
- 5th Meeting : 1st Quizz
- 6th Meeting : Heat Transfer : convection, conduction,
- 7th Meeting : Heat Transfer : radiation, and its application
- 8th Meeting : Middle Test
- 9th Meeting : Kinetic Theory and The Ideal Gas Law: Molecular mass, the mole and Avogadro's number
- 10th Meeting : Kinetic Theory and The Ideal Gas Law: The Ideal gas law, Kinetic Theory of Gases
- 11th Meeting : Kinetic Theory and The Ideal Gas Law: Diffusion and its calculations
- 12th Meeting : 2nd Quiz
- 13th Meeting : Thermodynamics : Systems and its surrounding, The Zeroth Law of Thermodynamics, The First Law of Thermodynamics, Thermal Processes using Gas Ideal, Specific Heat Capacities.
- 14th Meeting : Thermodynamics: The Second Law of Thermodynamics, Heat Engine, Carnot Principles and The Carnot Engine
- 15th Meeting : Thermodynamics:, Air Conditioners and Refrigerators, Entropy, The Third Law of Thermodynamics and its Calculations.
- 16th Meeting : Final Test

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7. References

Main Sources:

Cutnell, (2009). *Physics* 7th Edition. ASIA Edition: Wiley

Giancolli (2005) *Physics*. 5th Edition, Wiley

Cengel (2002). *Thermodynamics*, Mc Graw Hills

Others:

Tipler. (2005). *Physics*, 5th edition : McGraw-Hills