



YOGYAKARTA STATE UNIVERSITY  
FACULTY OF MATHEMATICS AND NATURAL SCIENCES

LESSON PLAN 1

FRM/FMIPA/063-00

1. Faculty/Study Program : FMIPA/Physics Education
2. Course / Code : Introduction to Mechanics, Heat, and Sound
3. Credit : Theory: 3 SKS                      Practice : 0
4. Semester/Time : Sem: 1                      Time : 150 mnt
5. Basic Competence : Students understand the concept of force, different types of force, and their applications
6. Indicator:
  - a. Students are able to explain the concept of force
  - b. Students are able to differentiate between contact and field force
  - c. Students are able to measure the strength of a force
  - d. Students are able to explain Newton's First Law
  - e. Students are able to define inertial reference frame
  - f. Students are able to differentiate between inertial and non inertial reference frame
  - g. Students are able to explain inertial mass
  - h. Students are able to determine of charge to mass ratio of oil droplets
  - i. Students are able to determine of charge of colloidal particles
  - j. Students are able to explain Newton's Second Law
  - k. Students are able to explain gravitational force
  - l. Students are able to describe weight
  - m. Students are able to differentiate between weight and mass
  - n. Students are able to determine the acceleration of an object under a net force
  - o. Students are able to explain Newton's Third Law
  - p. Students are able to explain friction forces
  - q. Students are able to differentiate between static and kinetic friction force
7. Essential Concepts : force, mass, acceleration, Newton's first law, Newton's second law, Newton's third law, gravitational force, static friction force, and kinetic friction force



## 8. Learning Activity

| Component | Detail Activity   | Time        | Method  | Media                                     | Reference | Character   |
|-----------|---|-------------|---|---|-----------|---|
| Opening   | <ul style="list-style-type: none"> <li>The Class begins with an apprcpeption in form of a question:"Have you ever seen somebody push a car? Was that heavy? Why is that heavy? What about if more people push the same car at the same time?"</li> <li>Lecturer asks the smallest student to push his desk alone, then asks another student to help him. Next lecturer asks a question:"Was that heavy? Which one between the first and the second pushes is heavier?"</li> <li>Followed by explaining the objectives of the instruction.</li> </ul>  | 10 minutes  | AQestion and answer, demonst ration             | Table (Desk)                              | Textbook  | Curious, Creative and cooperative   |
| Main      | <ul style="list-style-type: none"> <li>The lecturer explains the concept of force, contact and field forces</li> <li>The lecturer demonstrate how to measure a force using a spring scale.</li> <li>The lecturer asks two students to measure forces using different spring scales.</li> <li>The lecturer explains Newton's First Law and its applications for the determination of charge to mass ratio of oil droplets and charge of colloidal particles.</li> <li>The lecturer raises a problem to solve, he then discusses the problem solving and gives students feed back.</li> <li>The lecturer explains Newton's Second Law</li> <li>The lecturer show acceleration due to net forces</li> <li>The lecturer explains the</li> </ul> | 130 minutes | Demonst ration, Discus- sion, and presenta tion | Work- sheets, 5 spring scales, 10 weights | Textbook  | Curious, responsible, logicaland critical thinking, creative, innovative, cooperative, dicipline, competitive |



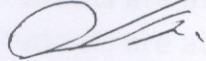
|         |  |            |  |  |          |  |
|---------|--|------------|--|--|----------|--|
|         | gravitational force and promotes a discussion on mass and weight <ul style="list-style-type: none"> <li>• The lecturer explains static and kinetic friction forces.</li> <li>• The lecturer gives students problems to solve in groups of four students, they discuss and present the results.</li> <li>• The lecturer gives students feed back.</li> </ul>        |            |  |  |          |  |
| Closure | <ul style="list-style-type: none"> <li>• The lecturer show his appreciation to the best 3 groups and encourages the rest of the groups to do the same thing.</li> <li>• Lecturer gives students assignments on Newton's law applications.</li> <li>• The lecturer reviews today's lecture and gives a brief introduction of topic for the next meeting.</li> </ul> | 10 minutes |  |  | textbook | Responsible, competitive, courage, future oriented |

### 9. Assessment

(The assessment is done by formative test, assignment and observation)

Mengetahui

Validator

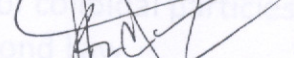


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Yogyakarta, December 18<sup>th</sup> 2013

Lecturer



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