

Code	10204		
Class name	Biomechanics		
Semester	1st	Lecture target	2
Unit Classification	Elective	Unit count	2
Charge teacher	NISHI Hirofumi		
Category	Basic educational subjects		
Class style	Lecture		
Class time	Mon/3		
NO.	Cb21146w		

Professional career-experienced <input type="checkbox"/> a course taught by a teacher with practical experience On practical contents related to class
Languag <input type="checkbox"/> using languages other than Japanese
Active learning elements <input type="checkbox"/> problem-solving-learning in cooperation with external organizations based on agreements <input checked="" type="checkbox"/> discussion,debate <input checked="" type="checkbox"/> group work <input type="checkbox"/> presentation <input type="checkbox"/> practical training,fieldwork

Class outline,goal
To understand the mechanisemes of various human movements caused by the work of locomotorium such as bones, muscles, and joints. To understand approaches by the kinematics , kinetics, and energetics of human movements.
Class plan

Lesson 1. Guidance

What is biomechanics?

Lesson 2. Biomechanics of muscle tissue

Structure of skeletal muscle, Mechanism of force generated by muscle contraction

Lesson 3, Energy supply systems

Energy supply for muscle activity

Lesson 4, The structure of human body

Bone, Muscle, Joint

Lesson 5, Human motor control

Motor control, Force-velocity curve

Lesson6, Kinetics 1

Newton's first law, Inertia, Center of mass, Calculation of velocity

(discussion, debate, group work)

Lesson7, Kinetics 2

Newton's second law, Calculation of acceleration, Linear and rotational movement, torque

(discussion, debate, group work)

Lesson8, Kinetics 3

Newton's third law, Ground reaction force, Internal and external force (discussion, debate, group work)

Lesson9, Energy 1

Work and energy, Mechanical energy, Power

Lesson10, Energy 2

Momentum, Impulse, Impact and buffer

Lesson11, Sports movement 1

Walk and sprint

Lesson12, Sports movement 2

Jump

Lesson13, Sports movement 3

Trow and Hitting

Lesson14, Sports movement 4

Stretch-shortening cycle, Counter movement

Lesson 15, Summary

The Biomechanics to improve athletic ability

Grading method

- 1) The ability to explain the movement biomechanically
- 2) The ability to analyze and measure sports movements biomechanically
- 3) Knowledge and Understanding the central mechanism of powerful and skillful movement

Assigned books

Relevant references and textbooks will be introduced in the class.

Classroom equipment
Powerpoint slides
Advice on preparation and review
Preparation: Make calculations in physics possible in advance.(about 20 min) Review: Learn about body mechanics and kinetics calculations.(about 20 min)
Class rules
Never be late.
Grading Criteria
1) Class participation(20/100) 2) Task(20/100) 3) Final exam(60/100)
Feedback method
At the beginning of the class, I sill explain the task.
Note
None
Office hour
THU/1
Improvements from the results of the previous year's class evaluation questionnaire
none