Course number	U-LAS12 10015 LE57		
Course title (and course title in English)	Advanced Dynamics Advanced Dynamics	Instructor's name, job title, and department of affiliation	Graduate School of Engineering Associate Professor,KIM SUNMIN
Group	Natural Sciences	Field(Classification)	Physics(Foundations)
Language of instruction	English	Old group	Group B
Number of credits	2		
Number of weekly time blocks	1	Class style	Lecture (Face-to-face course)
Year/semesters	2026・Second semester		
Days and periods	Tue.3	Target year	Mainly 1st year students
Eligible students	For science students		

[Overview and purpose of the course]

This course deals with the mechanics of rigid body based on Newton's mechanics. Description of motion of rigid bodies and related applications will be explained in detail.

[Course objectives]

To understand various dynamic topics comprehensively based on many practical examples and problems

[Course schedule and contents)]

The main topics in this lecture are as follows;
(Each items will be covered by 2-3 weeks)

1. Curvilinear motion of a particle [1 week]
- Rectangular components, normal and tangential components, cylindrical components
2. Planer motion of a rigid body [2 weeks]
- Translation, rotation about a fixed axis, relative motion analysis using rotating axes
3. General motion of a rigid body [2 weeks]
- The time derivative of a vector in a rotating reference frame
4. Force and energy of a rigid body [3 weeks]
- Mass moment of inertia, equations of motion, principle of work and energy, conservation of energy
5. Impulse and momentum of a rigid body [3 weeks]
- Linear and angular momentum, impact, principle of impulse and momentum, conservation of momentum
6. Three dimensional motion analysis [3 weeks]
- Moments and products of inertia, equations of motion, gyroscopic motion
7. Final Examination
8. Feedback [1 week]

[Course requirements]

Having taken the course"Fundamental Physics A" is recommended.

[Evaluation methods and policy]

Evaluation is based on assignments (40%) and written tests (final exam: 60%).

Continue to Advanced Dynamics(2)↓ ↓ ↓

Advanced Dynamics(2)

[Textbooks]

Not used
Some handout materials will be provided during the class.

[References, etc.]

（References, etc.）
R. C. Hibbeler 『Dynamics』 （Prentice Hall）ISBN:978-0-13-291127-6（very well organized textbook with abundant examples）

[Study outside of class (preparation and review)]

Self-review is strongly recommended after each lecture.

[Other information (office hours, etc.)]

No specific office hour. Email communication is preffered through [kim.sunmin.6x@kyoto-u.ac.jp].

[Essential courses]

Faculty of Science