科目ナンバリング	U-LAS12 10033 LE57						
授業科目名<英訳>	Advanced Dynamics-E2 Advanced Dynamics-E2			担当者所属職名・氏名	工学研究科　講師　BANERJEE, Amit		
群	自然科学科目群			分野(分類)	物理学(基礎)	使用言語	英語
旧群	B群	単位数	2単位	週コマ数	1コマ	授業形態	講義（対面授業科目）
開講年度・開講期	2024・後期	曜時限	火4	配当学年	主として1回生	対象学生	理系向

[授業の概要・目的]

This course aims to introduce advanced concepts of classical mechanics. After learning the content of this course, students will be able to apply Newtonian mechanics to solve advanced problems of classical mechanics, including but not limited to: (a) rotation of rigid bodies, (b) motion under central forces, for example, planetary motion, (c) motion observed from non-inertial frames, etc. Students are also expected to be able to advance their mathematical skills, particularly regarding vector calculus and 2D/ 3D polar coordinate systems by studying the concepts of this course.

[到達目標]

(1) To build upon the ideas learnt in Fundamental physics A, (2) To be able to understand advanced concepts of dynamics of rigid bodies, (3) To develop the ability to tackle practical problem solving.

[授業計画と内容]

1. Brief review of Cartesian, Spherical and Cylindrical coordinate systems, vector analysis and coordinate transformation, Newton's laws, inertial and non-inertial frames, conservation of energy and momentum, collision problems, distributed systems and center of mass (5 weeks)

2. Central forces, angular momentum, planetary motion and Kepler's laws (2 weeks)

3. Motion observed from non-inertial frames; fictitious forces (2 weeks)

4. Simple motion of Rigid bodies, angular momentum, rotation along fixed axis, moment of inertia (2 weeks)

5. General motion of rigid bodies, inertia tensor and principal axes, Euler's equations of rigid body rotation; precession and nutation, Free symmetric top, Euler angles, heavy symmetric top (3 weeks)

6. Feedback (1 week)

[履修要件]

Completion of Fundamental Physics A is required.

[成績評価の方法・観点]

Evaluation will be based on active participation (10%), one assignments (40%), take-home type final examination conduced via Panda (50%).

[教科書]

授業中に指示する

Advanced Dynamics-E2(2)へ続く↓↓↓

Advanced Dynamics-E2(2)

[参考書等]

（参考書）
授業中に紹介する

[授業外学修（予習・復習）等]

Following study materials and working on assignments

[その他（オフィスアワー等）]

Will be discussed in the class.