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| Course Name [科目名] | Mechanics of Machines and Vibration |
| Instructor Name [教員] |  |
| Course Structure [授業形態] | Lecture and Exercise |
| Course Credits [単位数] | 3 |
| Course Overview [概要] | This course introduces the topic of vibrations which is a direct application of the principles of kinetics. In this course, the study of discrete systems is limited to those whose configurations are described with one displacement or angular variable. We will describe the free vibration of particles and forced vibration of particles which are subdivided into un-damped and damped motion categories. Then, we will discuss the vibration of rigid bodies. Finally, an energy approach to the solution of vibration problems and several applications relevant to mechanical machineries, e.g. motors, rotational machines, etc. including vibration measurement and control are also introduced. |
| Course Key Words [キーワード] | Vibration, mode analysis, natural frequency, |
| Academic Goal [目標] | 1. The students can derive the equation of motion of the one(multi)-degree-of-freedom mass spring damper system and find the solutions. 2. The students can calculate the natural frequency and the damping ratio of free vibration system. 3. The students can calculate the magnification ratio of the forced vibration system including the applications of the mechanical machineries. 4. The students understand the principle of seismic instruments and the automotive suspension vibration characteristics and vibration control. |
| Course Schedule [授業内容] | Week 1 : Free vibrations of particles.   1. Free vibration of rigid bodies. 2. Energy Method   4. Midterm Exam  5. Forced vibrations (undamped)  6. Forced vibrations (damped)   1. Transmissibility and Applications on Mechanical Systems   8. Seismic Instruments   1. Vibration Analysis : Fourier Transformation, etc. 2. Automotive Suspension and Control, 2-DOF vibration system   Summary and Examination |
| Textbooks, References,  and Supplementary Materials  [テキスト、参考書、その他] | Engineering Mechanics:Dynamics, Meriam and Kraige  Vector Mechanics for Engineers:Dynamics, Beer, Johnston, Cornwell |
| Grading Philosophy  (Percentage / Criteria / Methodology)  [成績評価の方法] | Attendance　and Exercises 20%, Examinations 80 % |
| Other  (i.e. Expectations on Classroom  Conduct and Decorum etc.)  [その他] |  |