

Course Name	Mechanical Vibration and Control		
Semester, Year	Second Semester, 2018 (Fall Term)	Number of Credits	1 credits
Course level	2000	Course Number	27093
Instructor(s) (Institution)	Yukinori KOBAYASHI (大学院工学研究院)		
Course Objectives	This course offers fundamentals on mechanical vibration and control. Analytical approaches on vibration of single/ multi degree of freedom system are important to understand the dynamics of machine. It is also essential to obtain the mathematical model of the system when we design the controller to improve the stability of the system. Frequency response of the dynamic system is needed to understand its frequency characteristics. Mathematical approaches such as Fourier transform and Laplace transform are used to obtain the transfer function from the governing equation. Simple robotic mechanisms are introduced as an application of the theory.		
Course Goals	Understandings on fundamental analysis of vibration problems and essentials of control theory.		
Course Schedule	Week1 Free vibration of single degree of freedom system Week2 Energy method Week3 Forced vibration of viscous damping system Week4 Fourier transform and Laplace transform Week5 Transfer function and frequency response Week6 Free vibration of multi degree of freedom system Week7 Block diagram of feedback system Week8 PID control and state feedback		
Homework	One hour review about the topic of each week is recommended.		
Grading System	Several assignments are required to submit. 30% assignments 70% final examination		
Textbooks / Reading List	There is no one textbook that adequately responds to the goal of this lecture. Some reading materials and handouts will be prepared for your understanding. Please contact the instructor if you need further advice. Mechanical Vibrations (5th Edition) Singiresu S. Rao Pearson There is no one textbook that adequately responds to the goal of this lecture. Some reading materials and handouts will be prepared for your understanding. Please contact the instructor if you need further advice.		
Websites			
Website of Laboratory	<a href="http://mech-hm.eng.hokudai.ac.jp/~rd/labo/index_en.html">http://mech-hm.eng.hokudai.ac.jp/~rd/labo/index_en.html</a>		
Additional Information			