

58:153(53:132) **Fundamental of Vibration Spring, 2009**

Instructor: Shaoping Xiao, Associate Professor
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Lecture Times: MWF 11:30am - 12:20pm @ 3505 SC

Instructor Office Hours: MWF 10:30am - 11:20am @ 2412 SC

Class website: <http://www.engineering.uiowa.edu/~sxiao/class/058-153/058-153.html>

Catalog Data

58:153: Fundamental of Vibration. 3 Credits. (Same as 53:132)

Analysis and evaluation of the vibration of linear discrete and continuous systems. Modeling techniques and simulations for vibration response, various excitations, model analysis and engineering applications.

Prerequisite: 57:019 Mechanics of Deformable Bodies

Grading:	* homework	40 %
	* mid-term exam	25 %
	* final exam	35 %

Textbook: Prof. Bhatti, Fundamental concepts of structural and mechanical vibrations,
 at University Book Store

Reference: S. Rao, *Mechanical Vibration*
 William T. Thomason and Marie D. Dahleh, *Theory of Vibrations with Applications*

Course Objective: The course provides students with an opportunity to develop and demonstrate an understanding of the fundamental of vibrations. They are expected to acquire and exhibit the ability to apply vibration principles to solve various engineering problems.

Course topics: Introduction; Spring-mass damper; Discrete models; Undamped free vibration; Damped free vibration; Modal superposition; Harmonic loads; Multiple DOF harmonic loads; Time-frequency signals; Discrete Fourier transform; Frequency domain solution; Duhamels integral; Newmarks method; Response Spectra; Energy method; Finite element method; Large scale eigenvalue problem