

THE IBY AND ALADAR FLEISCHMAN FACULTY OF ENGINEERING SCHOOL OF MECHANICAL ENGINEERING Tel: +972-3-6408158, Fax: +972-3-6407617 TEL AVIV UNIVERSITY, Ramat Aviv 69978, ISRAEL הפקולטה להנדסה ע"ש איבי ואלדר פליישמן בית הספר להנדסה מכנית 03-6407617, פקס: 03-6408158 אוניברסיטת תל-אביב רמת-אביב 69978 ישראל

Theory of Vibrations 0542-4220

סמסטר "ב" שנת הלימודים תשע"ג Spring 2021

Classes		Tuesday, 12-14; Wednesday 13-15, ZOOM	
Lecturer	Office: Hours: e-mail:	Dr. Igor Berinskii Wolfson 237, Tel. 640-83-97 By appointment igorbr@tauex.tau.ac.il	
Assistant		Or Lasri	
	e-mail:	orlasri@mail.tau.ac.il	
Prerequisites	Dynamic	es of Rigid Bodies, Mechanics of Solids I	
Topics	Basic concepts of vibrations. Derivation of equations of motion. One degree of freedom systems. Free vibrations. Natural frequency of the system. Forced vibrations: harmonic forcing, periodic forcing, and arbitrary forcing. Periodic forcing and resonance. Physical explanation of the resonance phenomenon. Response to shock. Harmonic motion of the supports, vibration measuring instruments, vibration isolation. Shock spectrum of one degree of freedom systems. Vibration absorbers.		
	Two degree of freedom systems. Harmonic forcing of two degree of freedom systems. Dynar vibration absorbers, antiresonance. N-degree of freedom systems. Natural frequencies and nature modes. Orthogonality of natural modes. Expansion theorem and modal analysis. Gene derivation and analytical solutions of free and forced vibrations. Semi-definite systems possess zero natural frequencies. Systems with repeated frequencies.		
	Continuous systems. Typical analytical solutions in: a) vibrations of strings; b) axial vibrations of rods with a uniform cross section; c) torsional vibrations of rods with a circular cross section; d) flexural vibrations of Euler-Bernoulli beams. Cases of different boundary conditions. Orthogonality of natural modes under different boundary conditions. Derivations of exact solutions under free and forced vibrations.		
Textbook	L. Meiro	vitch "Fundamentals of vibrations", Boston : McGraw-Hill, 2001	
Grading	Homewo Midterm Final		