Course Description

This course provides an introduction to linear mechanical vibration theory and its applications. The course will provide the student a clear understanding of the principal concepts and mathematical techniques used in the analysis and design of mechanical systems that exhibit small oscillatory motion. Topics covered include:

- Overview of basic concepts in mechanics
- Modeling of single and multiple degree of freedom oscillatory systems
- Analytical and computational solution of free and forced oscillatory systems
- Damping in structural and mechanical systems
- Eigenvalue problems and modal analysis
- Laplace transforms, transfer functions, feedback control, and stability
- Analytical dynamics
- Applications to vehicle structural dynamics modeling

Required Text


References


Grading

Homework – 30%
Midterm – 30% (8th week)
Final – 40%
Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards [https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions]. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [http://policy.usc.edu/scientific-misconduct].

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity [http://equity.usc.edu] or to the Department of Public Safety [http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us]. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men [http://www.usc.edu/student-affairs/cwm/] provides 24/7 confidential support, and the sexual assault resource center webpage [http://sarc.usc.edu] describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute [http://dornsife.usc.edu/ali], which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs [http://sait.usc.edu/academicsupport/centerprograms/dsp] provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information [http://emergency.usc.edu] will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.