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| COURSE NUMBER: ME 5248, 4 credits | COURSE TITLE: Vibration Engineering |
| TERMS OFFERED: Spring | PREREQUISITES: ME 3281 |
| TEXTBOOKS/REQUIRED MATERIAL: "Theory of Vibration with Applications", Thomson and Dahleh, Prentice-Hall, 5th Edition | PREPARED BY: Professors Rajamani and Kelso DATE OF PREPARATION: May 22, 2007 |
| COURSE LEADER(S): Professors Rajamani | CLASS/LABORATORY SCHEDULE: Two 120 minute lectures per week CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES: 100 % Engineering Topics |
| CATALOG DESCRIPTION: Apply vibration theory to design; optimize isolators, detuning mechanisms, viscoelastic suspensions and structures. Use modal analysis methods to describe free vibration of complex systems, relating to both theoretical and test procedures. | COURSE TOPICS: <ol style="list-style-type: none"> 1. Introduction to vibrations and one-degree-of- freedom systems 2. Introduction to Bode Plots 3. General forced response of one-degree-of- freedom systems 4. Multiple-degree-of-freedom systems 5. Newtonian and Lagrangian Mechanics 6. Applications of vibration analysis : Vibration suppression 7. Applications of vibration analysis : Vibration isolation 8. Applications of vibration analysis : Sensor design 9. Vibrations of distributed parameter systems |

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| COURSE OBJECTIVES | <ol style="list-style-type: none"> 1. Provide the theoretical background to the vibration of mechanical systems. 2. Demonstrate practical applications for vibration analysis |
| COURSE OUTCOMES | <p>(Letters shown in brackets are linked to program outcomes a-k)</p> <ol style="list-style-type: none"> 1. Students understand the engineering science of system dynamics as applied to vibration of mechanical systems [a] 2. Students are able to solve equations and calculate the transient and frequency response for first and second order vibrating systems [a] 3. Students can use Matlab to simulate the response of linear systems of any order. [k] 4. Students can use the theory to solve practical vibration problems such as vibration suppression and isolation and sensor design. [a, c] |
| ASSESSMENT TOOLS: | <ol style="list-style-type: none"> 1. Homework assignments 2. Mid-semester exam 3. Final exam |

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Nature of Changes:

This document was reviewed and no changes were made in 2007.