

**FALL SEMESTER 2008**  
**ME 404/504 - VIBRATIONS**

**Professor S. R. Ibrahim**

**CONST 1037, 11:00 – 12:15 AM, Call Numbers 10478/10498**

*Vibration is the study of oscillatory motions. The ultimate goals of this study are to determine the effects of vibration on the performance and safety of systems, and to control its effects.*

*The subject of vibrations is fascinating and is continually acquiring greater importance in the modern science and engineering curricula, as it plays an important role in almost every field of applied science today. This is mainly due to the increasing complexities of modern structures, aerospace and non-aerospace. These complex structures require sophisticated analytical and experimental vibrational studies for successful operation, response prediction, stress level evaluation, stability and control of such structures.*

**TEXT:** William T. Thomson and Marie D. Dahleh: Theory of Vibration with Applications; Prentice-Hall, Inc., 5th Edition, 1998.

- REFERENCES:**
1. R. R. Craig, Jr.: Structural Dynamics: An Introduction to Computer Methods; Wiley, 1981.
  2. D. J. Inman: Vibration With Control, Measurement and Stability; Prentice Hall, 1989.
  3. D J. Inman; Engineering Vibrations; Prentice Hall; 1994.
  4. L. Meirovitch: Elements of Vibration Analysis; Second Edition, McGraw Hill, 1986.
  5. S. S. Rao: Mechanical Vibrations; Pearson, Prentice Hall, 2004.
  6. R. F. Steidel, Jr.: An Introduction To Vibrations; third Edition, 1989.
  7. F. S. Tse, I. E. Morse and R. T. Hinkle: Mechanical Vibrations, Theory and Applications: Second Edition, Allyn and Beacon, Inc.
  8. R. K. Vierck: Vibration Analysis; Second Edition, Harbor & Row, 1979.
  9. B. H. Tongue: Principles of Vibration, Oxford, 1996.
  10. B. Blachandran and E. B. Magrab: Vibrations; Thomson Books/Cole, 2004.

**COURSE CONTENTS:** Chapters 1, 2, 3, 5 and 6 are the main contents of this course. If time allows, Chapter 4 will follow. Pace is adaptive with class feedback.

<b>GRADING:</b>	Attendance	10 %
	Assignments	20 %
	Tests	70 %

**GRADUATE CREDIT:** Students taking ME 504 will be required to do a computer project which will count as two assignments. (ME 404 students may opt to have the project as extra credit to replace two assignments).

**COMPUTER USAGE:** Computer problems will be incorporated in this course. Directions on using "MATLAB" will be given in lectures.

**ASSIGNMENTS:** Assignments submitted should be **neat and well organized. No assignment will be accepted after its due date.**

**TESTS:** Four tests will be given during this semester. Tests will follow the completion of Chapters 1, 2, 3 and 5.

**QUIZZES:** NONE

**EXPECTED COURSE OUTCOME:** Students completing this course are expected to develop:

1. An ability to apply knowledge of mathematics, science, and engineering
2. An ability to design a system, component, or process to meet desired needs
3. An ability to identify, formulate, and solve engineering problems
4. An understanding of professional and ethical responsibility
5. A recognition of the need for, and an ability to engage in life-long
6. A knowledge of contemporary issues
7. An ability to use the techniques, skills, and modern engineering tools necessary for engineering
8. To apply the knowledge of differential equations, and multivariate calculus to mechanical engineering design and analysis problems
9. Ability to write computer programs, and to use already developed software in analysis and design of engineering system

**I WELCOME YOU TO MY ME 404/504 CLASS AND WISH YOU ALL SUCCESS.**

Professor S. R. Ibrahim  
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**Note:**

- \*The Honor System detailed in the ODU catalog will be strictly applied in this course.
- \*Tuesday, November 4th is the last day to withdraw from classes without instructor's signature.
- \*If you miss a lecture contact one of your classmates to know about material covered, announcements, handouts, etc.
- \*No make-up tests will be given. With a permission obtained prior to the test and for a valid and documented emergency, the subject test will be excused. A 5% penalty, on the average of remaining tests, will apply for each missed tests with a maximum of two excused tests.
- \*Office Hours: TR 1:00 – 2:30 PM