California State University, Northridge  
Department of Civil Engineering and Construction Management  
**AM410: Vibration Analysis**  
Summer 2016

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<th>Course</th>
<th>Time</th>
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<tr>
<td>AM410</td>
<td>MW 9:00 – 10:35</td>
<td>JD3516</td>
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**Instructor:**  
Nazaret Dermendjian, Ph.D., P.E.  
Office: JD4507  
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Email: nazaret.dermendjian@csun.edu  
Webpage: [www.csun.edu/~nazaret](http://www.csun.edu/~nazaret)

**Office Hours:**  
Tuesdays and Thursdays 11:00 – 12:30

**Catalog Description:**

Study of the vibratory motion of linear single degree of freedom systems. Equation of motion, free vibration response and transient and steady state excitation. Introduction to multi-degree-of-freedom systems. (Design units: 0)

**Course Prerequisite:**  
AM 316 – Engineering Dynamics  
CE 340 – Strength of Materials

**Recommended Textbook:**  
William T. Thomson, Marie Dillon Dahleh  

**Course Objectives:**

There are five basic objectives in this course:
1. Study of single degree of freedom systems
2. Study of harmonic excitation
3. Study of general forcing functions
4. Study of response spectra
5. Study of multi-degree of freedom systems

**Student Learning Outcomes:**

Students in AM410 are expected to attain and demonstrate the following program outcomes:

(a) an ability to apply knowledge of mathematics, science and engineering.  
(c) an ability to design a system, component or process to meet desired needs.
(e) an ability to identify, formulate and solve engineering problems.
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

**Program Educational Objectives:**

The program outcomes demonstrated by students in AM410 will foster attainment of program educational objectives

1. Graduates will accept increasing levels of responsibility over time and obtain their desired professional registration.
2. Graduates will continue further studies in engineering and other professional disciplines as appropriate to their careers.

**Topics Covered:**

<table>
<thead>
<tr>
<th>Topics Covered</th>
<th>Text Chapters</th>
<th>Course Objectives</th>
<th>Student Learning Outcomes</th>
<th>Program Educational Objectives</th>
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<tbody>
<tr>
<td>Single degree of freedom</td>
<td>1,2</td>
<td>1</td>
<td>a, c,k</td>
<td>1,2</td>
</tr>
<tr>
<td>Harmonic excitation</td>
<td>3</td>
<td>2</td>
<td>a,c,e,k</td>
<td>1,2</td>
</tr>
<tr>
<td>General forcing functions</td>
<td>4</td>
<td>3</td>
<td>a,c,e,k</td>
<td>1,2</td>
</tr>
<tr>
<td>Response spectra</td>
<td>Notes</td>
<td>4</td>
<td>a,c,e,k</td>
<td>1,2</td>
</tr>
<tr>
<td>Multi degree of freedom systems</td>
<td>5</td>
<td>5</td>
<td>a,c,e,k</td>
<td>1,2</td>
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</tbody>
</table>

**Students with Disabilities:**

Any students with disabilities or other special needs and who need special accommodations in this course, are invited to share these concerns or requests with the instructor as soon as possible.

**Academic Dishonesty:**

All work in this course must be completed in a manner consistent with Section 41301, Title 5, California Code of Regulations, as published in the University Catalog.

**Homework Assignments and Exams**

a. All work should be done on engineering paper in pencil unless it is a computer printout
b. Work done in an unprofessional manner will not be graded.
c. All exams are open book and notes.
d. Identical solution on exams, indicating copying, will result in an F in the course for both students involved. Additional disciplinary action may be taken by the University as well.

**Grading Policies:**

The plus/minus grading system will be used and work will be evaluated as follows:

<table>
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<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Homework Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Exam # 1</td>
<td>30%</td>
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<tr>
<td>Exam # 2</td>
<td>30%</td>
</tr>
<tr>
<td>Exam # 3</td>
<td>30%</td>
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**Grading Scale:**

- 90+    A
- 86-89  A-
- 82-85  B+
- 78-81  B
- 74-77  B-
- 70-73  C+
- 66-69  C
- 60-65  C-
- 55-59  D
- 54-    F