

# EML4220-1047(24749) - Vibrations

## **EML 4220 Syllabus**

Academic Term: Spring 2020

MWF, 6th Period, 12:50pm Location: FLG 220

### **Principal Instructor**

Dr. Daniel J. Dickrell III  
djd3@ufl.edu  
352-392-1196

130 MAE-C

Office Hours: Tuesday and Wednesday 2-3:30PM

### **Teaching Assistants:**

- Isabel Hess
  - Office Hours: Thursday 9:00AM-11:00AM, Friday 2:00PM-4:00PM
  - NEB 109
- Mitchell Parker
  - Office Hours: Monday 10:00AM-12:00PM, Thursday 2-4:00 PM
  - Marston Science Library near 3D printers

### **Course Description**

Single degree of freedom systems, multiple degree of freedom systems. Application to mechanical systems with problems employing computer techniques. (3 credit hours)

### **Course Pre-Requisites / Co-Requisites**

EGM 3344, EGM 3401, EGM 3520 and MAP 2302 with minimum grades of C

### **Course Objectives**

Upon completion of this course, students will demonstrate:

1. a descriptive and qualitative understanding of single and multiple degree of freedom modeling of vibratory mechanical systems;
2. the ability to use advanced mathematics to analyze vibratory mechanical systems;
3. an understanding of experimental techniques used to measure mechanical vibrations; and
4. the ability to create computational simulations of vibratory mechanical systems.

### **Materials and Supply Fees**

N/A

### **Required Textbooks and Software**

Title: MECHANICAL VIBRATIONS Author: SCHMITZ

ISBN: 9781461404606 Publisher: SPRINGER Copyright:

Cover: e-book Edition: This text is **required**

**Comments or Notes for Students and Vendors:** This book is available for free PDF download via the UF Library system (Call Number: TA355 .S36 2012eb). If you would like a hardcopy version, you may also order that.

Microsoft Excel and Matlab are available on UF Computer Lab computers on campus and through UF Apps

### **Course Schedule**

See schedule below

### **Attendance Policy, Class Expectations, and Make-Up Policy**

Class policies

- Cheating or any other dishonesty will result in failure and prosecution according to university policies. ASME has a website dedicated to engineering ethics, <http://www.asme.org/ethics/>.
- Students are responsible for all announcements, assignments, etc. made during lectures, including changes in the scheduling of lecture topics, quizzes, and exams.

Please make appropriate arrangements with a classmate if you need to miss a class.

- Attendance is highly recommended.
- Students are expected to conduct themselves in the classroom in a manner which does not interfere with the other students' learning.
- Any changes in the schedule or assignments will be communicated to the class via email using your Gatorlink (@ufl.edu) email address and using the course web site. You are responsible for monitoring this mailbox and the web site regularly for any class notices.

### **HW policies**

- Work must be neat, readable, and show all major steps.
- Answers must be boxed and clearly visible.
- Must be on 8.5" x 11" paper.
- Must have the HW number and your name written in the upper right hand corner of the page(s).

### **Exam policies**

- All exams will be held in the same room as lectures. Exam dates will be posted on the Course Calendar.
- A formula card will be allowed during exams and quizzes (3" x 5" handwritten, two sided). A simple scientific calculator will be allowed (no graphing calculators).
- It is the students' responsibility to communicate their knowledge on the exams. In order to be able to grade your work, it must be neat, legible, and follow in logical steps with all work shown. Partial credit may be given for work which can be followed and the nature and magnitude of the mistake identified. No credit will be given for incorrect answers with insufficient indication of how they were obtained.

Excused absences must be consistent with university policies (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) documentation in the undergraduate catalog.

### ***Evaluation of Grades***

Homework - 10%

Final Project - 15%

First Exam - 25%

Second Exam - 25%

Last Exam - 25%

### ***Grading Policy***

A score of **92** will be sufficient for a grade of **A**

A score of **82** will be sufficient for a grade of **B**

A score of **72** will be sufficient for a grade of **C**

notes:

(1) At the end of the semester at least one homework set will be dropped to take into consideration life events outside of class (sickness, weddings, road-trips, etc.)

(2) If the overall class grade distribution is significantly outside an acceptable range, the grading scale will be adjusted to fix the achievement disparity

(3) Plus and minus grades will be added as final grades are calculated. The grading scale shown above are promises: if you get a 92 you WILL get an A, if you get a 82 you will get a B (at minimum) etc.

More information on UF grading policy may be found

at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx> (Links to an external site.)

READ AND UNDERSTAND:

As the assignment deadlines will be clearly posted on the course websites, late homework

assignments or quiz submissions past the deadline will not be accepted, **ever.**

*(So don't email me about how you took a nap and missed the deadline, etc. These emails are simply deleted because it is assumed your read and understood the above statement.)*

There is no excuse for missed assignments, this is your responsibility to act like a professional student. Don't ask or beg for special treatment. It is embarrassing for you as well as your instructor.

### **Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352- 392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### **Course Evaluation**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### **University Honesty Policy**

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### **Software Use**

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to

monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### **Student Privacy**

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see:  
<http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

### **Campus Resources:**

#### Health and Wellness

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

#### Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.  
University Police Department at 392-1111 (or 9-1-1 for emergencies), or  
<http://www.police.ufl.edu/>.

### **Academic Resources**

E-learning technical support, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>. Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.

<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.

<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus:

[https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf). On-Line Students

Complaints: <http://www.distance.ufl.edu/student-complaint-process>.

### **Professional Component (ABET):**

4A. EML 4220 supports the following program outcomes as listed in the Mission Statement of the Department of Mechanical and Aerospace Engineering:

(M1) apply knowledge of chemistry and calculus based physics with depth in at least one of them;

(M2) apply knowledge of advanced mathematics through multivariate calculus and differential equations; (M3) be familiar with statistics and linear algebra; and

(M4) possess ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.

4B. Mathematical sciences (30%), physical sciences (30%), engineering sciences (30%), engineering design (10%).

Relation to Program Outcomes (ABET):

Course Title, Prefix, and Number Page 1 Course Instructor and Academic Term

Outcome	Coverage*
a. Apply knowledge of mathematics, science, and engineering	High
b. Design and conduct experiments, as well as analyze and interpret data	
c. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	Low
d. Function on multidisciplinary teams	
e. Identify, formulate, and solve engineering problems	High

f. Understand professional and ethical responsibilities

g. Communicate effectively

h. Understand the impact of engineering solutions in a global, economic, environmental, and societal context Low

i. Recognize the need for and be able to engage in lifelong learning Low

j. Understand contemporary issues Low

k. Use the techniques, skills, and modern engineering tools necessary for engineering practice High

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.