

EML 4220 – Vibrations

Sections: 1046 (3rd period, #13514) and 1047 (6th period, #22948)
Spring 2021 Syllabus

Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course e-learning/Canvas site and/or announced in class.

Meeting Times / Location:

Section 1046 (#13514): MWF 3rd period (9:35am – 10:25am) / Online

Section 1047 (#22948): MWF 6th period (12:50pm – 1:40pm) / Online

Instructor:

Gloria J. Wiens, Department of Mechanical and Aerospace Engineering

E-mail address: gwiens@ufl.edu (Please contact through the Canvas website)

Office Location: Zoom Office / Breakout Rooms (held online via <https://ufl.zoom.us>)

Office hours: Monday and Wednesday (2:00pm – 3:00pm), other times via appointment.

Teaching Assistants (TA) and Graders:

Office Hours (held online via <https://ufl.zoom.us>). Please contact TAs through the Canvas website.

- **Jerome David**, jerome.david@ufl.edu
Office hour: Thursday (4:00pm – 5:00pm)
- **Ninad Gaikwad**, ninadgaikwad@ufl.edu
Office hour: Friday (10:30am – 11:30am)
- **Riley Richards**, rileyrichards@ufl.edu
Office hour: Tuesday (10:30am – 11:30am)
- **Sanjana Das**, Grader

Catalog Course Description:

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

Course Pre-requisites and Co-requisites:

Prerequisites: EGM 3344, EGM 3401, EGM 3520 and MAP 2302 with minimum grades of C. Coreq: None

Course Objectives:

The purpose of the course is to provide students with the fundamentals needed to perform vibration analysis for the design and use of various machines, systems, and structures. Upon completion of this course each student should have:

1. Basic understanding of vibration analysis and the ability to apply this understanding to analyze and solve a given problem.
2. Basic understanding of damped and forced vibration in single and multiple degree of freedom systems.
3. The ability to apply advanced science and engineering principles in the design and analysis of structures to suppress or enhance vibrations.

Material and Supply Fees: None

Professional Component (ABET):

EML 4220 supports several program outcomes enumerated in the Department of Mechanical and Aerospace Engineering Assessment Plan and prepares students to attain the following outcomes. Specific Mechanical Engineering UF Student Learning Outcomes (SLO) supported by this course include: (SLO1) Apply knowledge of mathematics, science, and engineering principles to mechanical engineering problems; and (SLO3) Design a mechanical engineering system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

Relation of Course to Program Outcomes (ABET):

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	High [30%; method of assessment is in-class activities, quizzes, 3 exams and final]
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	Low [10%; method of assessment is in-class activities, quizzes, 3 exams and final]
3. An ability to communicate effectively with a range of audiences	
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Medium [15%; method of assessment is in-class activities, quizzes, 3 exams and final]
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software: (electronic version)

Mechanical Vibrations, Pearson, 6th Edition (2017)

Singiresu S. Rao

ISBN-10: 013436130X

ISBN-13: 9780134361307

TA355.R37 2017

This course is participating in UF All Access program. Login at the following website and Opt-In to gain access to your required eBook. <https://www.bsd.ufl.edu/G1CO/IPay1f/start.aspx?TASK=INCLUDED> – UF All Access will provide you with your required materials digitally at a reduced price and the ability to pay using your student account. This option will be available starting 1 week prior to the semester starting and ending 3 weeks after the first day of class. For print purchasing options or study guides and additional course materials please visit <https://www.bkstr.com/floridastore/home> or the UF Bookstore located in the Reitz Union.

E-Learning/Canvas system (<https://elearning.ufl.edu>) – all documents, homework, grades, etc. will be posted on this system.

Recommended Reading:

Tutorials to mathematical software MATLAB/Simulink. Software is useful to analyze vibrations.

Course Outline:

Harmonic Motion and Free Vibration (with damping)
Resonance and Harmonic Excitation
General Forced Response
Multiple Degree of Freedom Systems
Design for Vibration Suppression or Enhancement

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy and Class Expectations:

It is expected that this course will require at least 10 hours of effort per week when you consider time spent for lectures, reading assignments, quizzes/in-class activities, homework, and re-writing of your class notes. It is also expected that you will attend every lecture. If you cannot attend a lecture, please notify me prior to class. If you must miss lecture for any reason, you should obtain the lecture notes from another student. You will be held responsible for knowledge of all scheduling and policy announcements made in class and on course website.

You are expected to take a sincere interest in learning the classroom material. Keeping with this expectation, you are expected to show up on time for class. Please turn off all cell phones prior to the start of class. If you are a distraction in class, you will be asked to leave.

There will be in-class activities throughout the semester in which your participation level will be assessed for determining a portion of your final course grade. These activities may or may not be announced a priori and may include pre-read assignments and quizzes via Canvas. Homework problems will be assigned, but not graded. They are to serve as practice problems to help you master the material. Recitation/office hours are scheduled throughout each week should you need assistance in solving the problems or additional help in understanding the material.

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

Evaluation of Grades:

Students will be evaluated from their grades on the following, which are weighted as follows

- 16% Class Participation, Quizzes and other assignments with points assigned.
- 84% Exam 1, Exam 2, Exam 3 and Final Exam
(Based on TOP 3 Exam Scores out of the 4 Exams, that is Lowest Exam Grade Dropped)

ALL Exams MUST BE WRITTEN and SUBMITTED via Honorlock. Exams will be closed-book and closed-notes.

RE-GRADING POLICY: All 're-grade requests' must be submitted electronically in writing to the instructor (Dr. G.J. Wiens) within one week from the date the graded assignment (exam) is first returned. The written request must explain in detail what you want the grader to do and where you believe he/she has made a mistake in grading. The request must have a date on the top of the page, your name, your telephone number(s), and e-mail address. NOTE: Failure to view your graded assignment upon its electronic return does not change the one-week deadline for a re-grade request.

Grading Scale and Policy:

93.4 – 100	A	86.7 – 89.9	B+	76.7 – 79.9	C+	66.7 – 69.9	D+	0 – 59.9	E
90.0 – 93.3	A-	83.4 – 86.6	B	73.4 – 76.6	C	63.4 – 66.6	D		
		80.0 – 83.3	B-	70.0 – 73.3	C-	60.0 – 63.3	D-		

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Make-up Exam Policy:

Make-up exams will not be given since students are allowed to drop one of their three ‘In-Class’ or Final exam. Only extreme extenuating circumstances will be considered otherwise and not without a documented excused absence (e.g., documented extreme medical emergency). A missed exam will count as your dropped exam.

All submitted documented reasons for missing an exam (e.g., due to religious holiday, official university business, serious family emergency, military obligation, jury duty) will be retained on file and referenced during final course grade determination. Documentation must be submitted to the instructor (Dr. G.J. Wiens) a priori or within one week following the date of the missed exam.

Students Requiring Accommodations:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester. NOTE: Any requests must be made 5 university working days prior to the date for which accommodation is being requested.

Course Evaluation:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-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.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu

- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

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: <https://registrar.ufl.edu/ferpa.html>

Important Dates: ... NOTE: Exam dates are fixed & administered using Honorlock.

Combined semester exams, Sections 1046 (#13514) and 1047 (#22948):

Exam 1: Thursday, February 11, 2021, during Periods E2-E3, 8:20pm-10:10pm

Exam 2: Thursday, March 18, 2021, during Periods E2-E3, 8:20pm-10:10pm

Exam 3: Thursday, April 15, 2021, during Periods E2-E3, 8:20pm-10:10pm

In-class Activity Class Periods: (Attendance & Participation Required, held via <https://ufl.zoom.us>)

Tentative Dates: (Friday) January 22 & 29; February 26; March 5, 12 and 26; and April 9

Exam Prep Activities: (Wednesday) February 10; March 17; and April 14

Review Sessions: (held online via <https://ufl.zoom.us>)

Tuesday, February 9, 2021 (Time: 5:00pm-6:30pm)

Wednesday, February 10, 2021 (Time: 5:00pm-6:30pm)

Tuesday, March 16, 2021 (Time: 5:00pm-6:30pm)

Wednesday, March 17, 2021 (Time: 5:00pm-6:30pm)

Tuesday, April 13, 2021 (Time: 5:00pm-6:30pm)

Wednesday, April 14, 2021 (Time: 5:00pm-6:30pm)

Final Exam by Section:

Section 1046 (#13514) – Monday, April 26, 2021 (Time: 10:00am – 12:00pm)

Section 1047 (#22948) – Wednesday, April 28, 2021 (Time: 12:30pm – 2:30pm)

Holidays and No Lectures Dates:

Monday, January 18, 2021 – Martin Luther King Jr. Day

Wednesday, March 24, 2021 – Recharge Day

Other Dates noted:

February 8-11, 2021 – Career Showcase

Wednesday, April 21, 2021 – Last Day of Classes

Campus Resources:

Health and Wellness

U Matter, We Care:

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 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 a 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 Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

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/>.

COVID-19 related issues:

1. If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms](#).
2. Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. [Find more information in the university attendance policies](#).

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to 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://care.dso.ufl.edu>.

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