



SYLLABUS
MENG 4203 – 201: MECHANICAL ENGINEERING ANALYSIS
(Required Course)
Spring 2021

COURSE INSTRUCTOR

Dr. Zeki Ilhan (zeki.ilhan@msutexas.edu)
Office: McCoy Hall 219E
Phone: (940) 397-4004

TEACHER ASSISTANT

To be announced.

CLASS SCHEDULE

<i>Days</i>	<i>Time</i>	<i>Location</i>
Monday	09:00 am – 10:00 am	MY 136
Tuesday		
Wednesday	09:00 am – 10:00 am	MY 136
Thursday		
Friday	09:00 am – 10:00 am	MY 136

VIRTUAL OFFICE HOURS

<i>Days</i>	<i>Time</i>	<i>Location</i>
Monday	04:00 pm – 05:00 pm	via Zoom
Tuesday	04:00 pm – 05:00 pm	via Zoom
Wednesday	10:00 am – 11:00 am	via Zoom
Thursday	05:00 pm – 06:00 pm	via Zoom
Friday	10:00 am – 11:00 am	via Zoom

DELIVERY MODE: “HYBRID”

This course has been planned to be delivered in “hybrid” mode, which permits *socially distant classroom with assigned seating* as well as *livestreaming option* for students who are unable to be in class due to health reasons. Students can attend the regular lectures in-person or virtually via [Zoom](#). However, *students are expected to come to class to take the mid-term and final exams, unless they have a valid excuse due to health reasons or a major conflict to attend an athletic/academic event.*

Detailed instructions on how to connect with [Zoom](#) is posted in D2L. Simply click on the link provided in D2L to connect the lectures. Note that the same link will also be used to join virtual office hours without need for pre-coordinating with the instructor.

MASK REQUIREMENT

During class, each student must comply with MSU’s requirement for wearing a face covering as mandated in the [MSU Taskforce to Return to Campus](#).

ATTENDANCE POLICY

Attendance (either in-class or virtual) is mandatory for this class; hence, it represents a part of your overall grade. Attendance will be checked randomly on select lectures using the [AttendMe](#) app. (detailed instructions will be made available). However, for the health and safety of the others, *please consider following the class online whenever you are feeling sick or showing COVID-related symptoms.*

D2L (DESIRE 2 LEARN) & PULSE APP

I will use [D2L](#) platform for posting syllabi, course communication, lecture notes, assignments, and grades. Mobile version of the D2L platform is the [Pulse](#) app, which is available for free on iPhone, iPad, and Android devices. Consider downloading Pulse for instant notifications on course announcements, new content, grades, and more.

TECHNOLOGY REQUIREMENT

For the online portion of this class, students are required to have access to a hardware (computer, laptop, or iPad with webcam, microphone, and/or speakers), a basic scanning device and/or software such as [CamScanner](#). Be sure to review [D2L technology requirements](#) at MSU Texas website for online students.

CATALOG DESCRIPTION

Mathematical modeling, simulation, and statistical analysis of engineering systems and problems.

COURSE PRE-REQUISITES

MENG 4123 – Mathematical Methods for Engineers

REQUIRED TEXTBOOK

Schaum's Outline of Mechanical Vibrations by S. G. Kelly, McGraw-Hill, 1996, ISBN-13: 978-0070340411

LIST OF TOPICS COVERED*

- Equivalent system analysis
- Single degree of freedom vibration analysis.
- Rotation unbalance, vibration isolation.
- Harmonic, periodic, general excitation
- Fourier series representation
- Lagrange's equations
- Modal analysis for multi degree of vibrations.
- Numerical solutions of systems of ODEs

**Additional material might be covered as the time permits.*

GRADING SCHEME

The overall grade for the course will be based on the scores earned on the tests, homework assignments, and the class attendance. The contribution of each grade item to the overall score is provided in Table 1.

Table 1: Percentage contribution of each grade item to the overall grade.

Grade Items	Contribution
Test 1	25%
Test 2	25%
Final Exam	30%
Homework	15%
Attendance (online or in-class)	5%
TOTAL	100%

FINAL EXAM

Monday, April 26, 08:00 am – 10:00 am

CONFLICT RESOLUTION PROCESS

1. In the event of an issue with the course or the instructor, the student should first contact the instructor face to face or via e-mail. The faculty and the student will discuss the issue, and hopefully, a resolution is reached.
2. The student should notify the faculty via email again if the issue still did not get resolved step 1.
3. If not resolved, the student could then contact the Chair of the McCoy School of Engineering, Dr. Desai, face to face or via email, (raj.desai@msutexas.edu), and discuss the issue.
4. Dr. Desai will discuss the issue at hand with the faculty member. Dr. Desai will discuss the result of this discussion with the student. Hopefully, a resolution is reached on the issue after this step.
5. The student should notify the Chair via email if the issue still did not get resolved.
6. The Chair will contact the Dean and try to resolve the conflict. In case the conflict deals with the student grade, she will forward the case to the Grade Appeals Committee, if necessary.

COURSE ORGANIZATION AND ASSESMENT

- **Course Format:** This course consists of three 50-minute sessions each week. Class meetings will contain lecture sessions that cover the relevant topics for that particular class. Not all material can be covered during the class session, hence, expect to spend extra time outside of class to finish reviewing the material.
- **Student Attitude:** Once class starts, the use of cell phones, conducting private discussions, using the computer (unless requested by the instructor), working on anything that is not directly related to the course, and making derogatory remarks about your classmates or instructor will not be accepted and may result in your dismissal from the class.
- **Midterm Progress Reports:** In order to help students keep track of their progress toward course objectives, the instructor for this class will provide a Midterm Progress Report for at-risk students through their WebWorld account between the weeks 6-8 (2/15-3/8). Midterm grades will not be reported on the students' transcript; nor will they be calculated in the cumulative GPA. They simply give students an idea of where they stand at the midpoint of the semester. Students earning below a C at the midway point should schedule a meeting with the professor and seek out tutoring.
- **Homework Evaluation Method:** Your performance will be tested regularly throughout the semester by homework assignments. While several homework problems may be assigned as part of a homework assignment, it may be the case that only a subset of problems will be graded. However, you must attempt all problems. *Do not try to guess which problems will not be graded.*
- **Late Assignments:** Homework assignments must be turned in on the due date, at the due time. Late assignments will **NOT** be accepted. However, depending on the overall class progress, *one (or two) of the lowest graded assignments may not be included in the final grade.*
- **Exam Make-up:** Make-up exams will be given only in case of an **emergency** (accompanied by a doctor's report) or a major conflict due to a scheduled **athletic event** or a **conference**.
- **General Study Guidelines:** Plan on spending few hours outside of class each week to review the material weekly, and to work on homework assignments. Do not wait until the last day to start the homework or to prepare for exams. Utilize office hours throughout the semester whenever you need help about the assignments or the course material.
- **Academic Integrity Policy:** Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of the student handbook regarding student responsibilities & rights, and the intellectual property policy information about procedures and what constitutes acceptable on-campus behavior.
- **Disability Support Services:** If you have a documented disability that will impact your work in this class, please contact the [Disability Support Services](#) and the instructor to accommodate your needs.
- **Disclaimer Statement:** Information contained in this syllabus, other than grading policies, may be subject to change with advance notice, as deemed appropriate by the instructor.
- **Campus Carry Rules/Policies:** Senate Bill 11 passed by the 84th Texas Legislature allows licensed handgun holders to carry concealed handguns on campus, effective August 1, 2016. Areas excluded from concealed carry are appropriately marked, in accordance with state law. For more information, please refer to [campus carry rules and policies](#).

COURSE OBJECTIVES IN RELATIONSHIP TO ABET STUDENT OUTCOMES

Table 2: Specific outcomes of instruction matched with the ABET student outcomes (1-7)

SPECIFIC OUTCOMES OF INSTRUCTION	1	2	3	4	5	6	7
Given a complicated single degree of freedom mechanical system, students will be able to obtain its governing differential equation through equivalent system reduction techniques.	X						
Students should be able to obtain the response of single degree of freedom vibrating systems under harmonic excitation.	X						
Given the relevant scenarios, students should be able to perform vibration isolation and/or design against the rotation unbalance.	X	X					
Students should be able to use the Fourier series approximation to obtain the response of a single degree of freedom system due to a periodic excitation.	X						
Students should be able to apply Lagrange's equations in conservative and non-conservative forms to generate the equations of motion of multi degree of freedom systems.	X						
Given a multi degree of freedom mechanical system with appropriate initial conditions, students should be able to apply modal analysis techniques to generate the system response.	X						
Given a dynamic system governed by a set of linear or nonlinear ODEs, students should be able to apply numerical (Runge-Kutta) methods to obtain and plot the response in MATLAB.	X						

Table 3: Detailed descriptions of the ABET student outcomes (1-7) listed in Table 2.

OUTCOME	DESCRIPTION
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2	an ability to apply engineering design to produce solutions that meets specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
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.
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.