

**The University of Texas at Tyler**  
**College of Engineering**  
**Course Objectives, Syllabus, and Course Policy**  
**2019 Fall Semester (August 26-December 14)**

- COURSE:** MENG 4317 – Vibrations - (MENG4317.001-UT Tyler Campus, M, W 11:00 to 12:20 pm-RBN2007 & MENG4317.040-Houston Engineering Center B210 by Zoom).
- TEXT:** Singiresu S Rao: Mechanical Vibrations, Sixth Edition, Pearson, 2017 (ISBN 978- 0-13-436130-7) (OR) any other edition if you can buy it cheaper (including e-books).
- INSTRUCTOR:** Dr. M. Sathyamoorthy, Office – Engineering RBN3006 – 903 565 5939 – [msathyamoorthy@uttyler.edu](mailto:msathyamoorthy@uttyler.edu)– Office hours posted at the door and in Canvas—You can walk in anytime for help. HEC students are encouraged to send me emails with their questions and may also request Zoom sessions ahead of time during office hours.

**COURSE INFORMATION**

Catalog Description: Vibration analysis and prediction of the free and forced dynamic behavior of mechanical systems; first, second, and higher order systems; vibration isolation and absorption; vibration characteristics of rotating machinery.

**PRE-REQUISITES**

ENGR2302 (Dynamics), MATH 3305 (Differential Equations) with a minimum “C” grade.

**COURSE SYLLABUS & TOPICS COVERED**

The following topics will be covered. You are required to review all the material posted in Canvas and read the textbook on a regular basis.

Chapter 1: Fundamentals of Vibration  
Chapter 2: Undamped and Damped Free Vibration of Single-Degree-of-Freedom Systems  
Chapter 3: Harmonically Excited Undamped and Damped Vibration of Single-Degree-of-Freedom Systems  
Chapter 5: Two-Degree-of-Freedom Systems  
Chapter 6: Multi-degree-of-Freedom Systems  
Chapter 7: Determination of Natural Frequencies and Mode Shapes  
Chapter 8: Continuous Systems  
Chapter 9: Vibration Control  
MATLAB- Power Point Presentation by Justin Fritter & Peer Evaluation on November 18<sup>th</sup> in class.

## EXAMS

Exam 1 in class at UT Tyler Campus and at HEC on September 18.

Exam 2 in class at UT Tyler Campus and at HEC on October 16.

Exam 3 in class at UT Tyler Campus and at HEC on November 13.

2-HOUR FINAL COMPREHENSIVE EXAMINATION will be scheduled during the final exam week at UT Tyler Campus and at HEC.

## ASSESSMENT: HOMEWORK:

Homework is considered to be very important to fully understand the course material.

Completing your homework is an absolute necessity to do well in this course. Therefore, I strongly urge each of you to complete the homework assignments in a timely manner.

Homework assignments and solutions will be posted in Canvas. Homework will **NOT** be collected or graded. You are encouraged to work in groups to solve homework problems and learn from each other.

## EXAMS:

Closed-book, closed-notes exams will be given after completing a reasonable amount of material from the text as shown in the syllabus. A final 2-hour COMPREHENSIVE examination will be scheduled during the final exam week. You may use a one-page, self-written notes (cheat sheet with no problem solutions of any kind) for reference in each of the exams and the final examination. The cheat sheet will be collected with each exam. A formula sheet will be included with each exam. If you miss any exam without prior approval and excuse from me at least a week before the exam date, your grade for the exam will be counted as zero in the calculation of the final grade. If you were given an official excuse, then the percentage will be added to your final exam. **Please note that there are no makeup exams.**

## FINAL GRADES:

Final grades are based on:

3 Exams @ 20%, 20% and 20%	60%
Final Comprehensive Exam	<u>40%</u>
Total	100%

## NOTE

In computing your final course grade, your lowest exam grade (from exam 1, 2 or 3) will be replaced by the final exam grade if you did really well in the final exam. In other words, if your final exam grade is better than any of your earlier exam grades, it will be used to replace the lowest grade and will also be used as your final exam grade. Since final exam is a comprehensive exam this is an incentive for you to do really well in the final exam.

Course syllabus, and all course material will be posted in Canvas. Please review all the material posted in Canvas on a regular basis. I will use Canvas to post announcements and contacting

students by e-mail.

### CALCULATOR POLICY:

Use your own scientific calculator **TI-30X IIS** or any FE Exam approved calculator at each exam. You are not be allowed to use any other calculator or store any class material in the calculator during the exams. You cannot have i-phones, i-pads, i-watches or other electronic devices with you. If you bring i-phone or other electronic devices to the room, please leave them in your bag. I strongly recommend that you buy the TI-30X IIS calculator before the classes begin and get familiar with its use before the first examination.

### ATTENDANCE:

**Regular attendance is required.** Attendance will be taken in class for my records. In case you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made in the class on home works, exams etc.

**THERE WILL BE NO MAKE-UP EXAMS.** The percentage of any exam missed by a student will be added to his/her final comprehensive exam only if prior excuse is granted. Excuses will be given only if you have to miss an exam due to emergencies (such as medical and other emergencies) please inform me as soon as possible before or immediately after the exam. Class average for each exam will be announced in class and posted in Canvas after each exam. Final course grades will be determined on the basis of the class average. If your grade is consistently at the class average, you will get a "C" grade. If you miss any exam without getting **prior excuse and approval from me**, it will be counted as zero in the calculation of your final course grade. If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify me at least a week prior to the date of the planned absence.

Academic policies regarding withdrawal from the course, state-mandated course drop rule, grade forgiveness, student rights, absence for religious observance, grade replacement, social security and privacy, learning disability, academic dishonesty and others can be found at <http://www.uttyler.edu/wellness/rightsresponsibilities.php>. Some of the policies are reproduced below for your information.

#### **Grade Replacement/Forgiveness**

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to do so will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates will receive grade forgiveness (grade replacement) for only three course repeats; graduates, for two course repeats during his/her career at UT Tyler.

#### **State-Mandated Course Drop Policy**

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the 12th day of class (See Schedule of Classes for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Registrar's Office and must be accompanied by documentation of the extenuating circumstance. Please contact the Registrar's Office if you have any questions.

#### **Disability Services**

If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability

Services counselor. In order to assure approved services the first week of class, diagnostic, prognostic, and prescriptive information should be received 30 days prior to the beginning of the semester services are requested. For more information, call or visit Disability Services located in the University Center, Room 3150. The telephone number is (903) 566-7079. Additional information may also be obtained at the following UT Tyler Web address: <http://www.uttyler.edu/disabilityservices>.

**Student Absence for University-Sponsored Events and Activities**

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

**Social Security and FERPA Statement:**

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

**COURSE OBJECTIVES:** By the end of this course students will be able to:

1. Formulate analyzable models of vibrating mechanical systems.
2. Solve single-degree-of-freedom (SDOF) free and forced vibration problems using analytical and computer methods.
3. Solve multiple-degree-of-freedom (MDOF) vibration problems using analytical and computer methods.
4. Vibration of continuous systems.