ENGR 3125.001 – Machine Dynamics & Vibrations

Instructor: Dr. Richard Ruhala, Associate Professor of Mechanical Engineering

Office: G-162  (Note: will be spending a lot of time this semester in new ME lab in Q217)

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work       cell/text

Email: rruhala@spsu.edu  (best way to reach me)

Class times:  T R 6:00—7:15 in Q-311

Office Hours:  

  
  

Wednesday  
1:30-4:30 pm


Thursday
2:00-3:00 pm & 7:30—8:30 pm

or by appointment


Basic drawing tools for drawing on Engineering Paper, such as mechanical pencil, red pen, blue pen, ruler, triangles, protractor, and compass.

Reference textbook:  Design of Machinery, Robert L Norton, any edition

Pre-Requisite:  ENGR 3122, Dynamics, and CSE 1301, Programming

Grading:  50%  Midterm Exams (2 at dates TBA)
25%  Final Exam (TBA but between Dec 5th and 11th – not cumulative)
25%  Homework, Design Problems/Projects, Computer Program(s), and Quizzes

Nominal Grading Scale:  90-100 A  80-89 B  70-79 C  60-69 D  0-59 F

Catalog COURSE DESCRIPTION

(3-credits)  The analysis of motion, velocity, acceleration, and forces in mechanisms and machines. Emphasis is placed on the analytical methods suitable for computerized analysis as well as graphical methods for visualization and preliminary design studies. Also an introduction to vibration theory, including the modeling and analysis of oscillatory phenomena found in linear discrete and continuous mechanical systems.
General LEARNING OUTCOMES

Upon the completion of this course, you should be able to:

1. Compute the natural frequency and predict the response for a one-degree-of-freedom system undergoing translational vibrations, with or without damping.
2. Compute the resonant frequency and predict the response for a machine with a rotating unbalance.
3. Compute the natural frequencies and illustrate the mode shapes of a two-degree-of-freedom system;
4. Calculate the mobility of planar mechanisms.
5. Calculate positions, velocities, and accelerations, of any point or link in a linkage mechanism.
6. Write a computer program which can calculate the position, velocity, acceleration, and/or force for machine dynamics or vibration problem.
7. Synthesize linkages to generate prescribed motions.
8. Use gear ratios in design of a spur gear train.

COURSE OUTCOME MEASURES and ASSESSMENT

Measures and assessment of the outcomes will be made by:

- Exams and Quizzes
- 2-hour Final Exam
- Homework assignments
- Student survey(s).
Fall 2012 Schedule & Assignments

See Weekly Schedule document and Reading & Homework Assignment documents on Vista. The later will provide you with the assignments to complete and clear due dates.

QUZZES & EXAMS

- Make-up exams or quizzes will be allowed only for excused absences. It is the student’s responsibility to contact the Professor prior to the exam if s/he cannot attend the exam at the regular scheduled time.
- Quizzes may be announced or unannounced.

HOMEWORK

- Homework will be assigned but may or may not be graded.
- It is your responsibility to do and understand the homework problems and concepts. Collaboration with other students is allowed, but copying is not. Seeing someone else’s solution will not help you on the quizzes and exams.
- Homework will not be accepted unless it is printed neatly, in pencil, on the front side only (non-grid side) of engineering green paper, following the engineering method (Given, find, solutions, and include sketches and diagrams as needed.)

EXPECTATIONS

- You are expected to check your email and Georgia VIEW Vista 8 daily. I will communicate with you via the email account that is assigned to you by SPSU (and not the . You are responsible for knowing where SPSU sends your email. You can direct it to another account if you choose (hotmail, etc.)
- It is in your best interest to attend every class. Attendance records are required by the University and excessive absences must be reported to the Office of the Registrar. Active class participation is also expected.
- SPSU has an Honor Code and a procedure relating to when academic misconduct is alleged. All students should be aware of this. Information about the Honor Code and the misconduct procedure may be found at http://spsu.edu/honorcode/
- Questions regarding the grading of a problem must be submitted in writing to the professor within one week from the date that the work was returned. Be aware that once a problem is reopened for grading, the grade on the disputed problems could theoretically go down if additional errors are discovered during
the grade-review. Explain on post-it or cover sheet or on HW in different color pen where you think the grading error was made.

RECOMMENDATIONS

- Use a 3-ring binder for notes and homework. This will allow you to organize your lecture notes, homework, quizzes and handout materials. Fill-in-the-blank type notes created by your professor will be handed out in class.

- As in every class, take comprehensive notes. Everything that the professor writes down, you should write in your notes. You should additionally take notes on some things that the professor verbalizes but does not write down. Writing notes helps increase your learning efficiency.

- Read the assigned readings before class and keep up with the homework problems. Work your brain like you are training your body for a marathon.

- Visit the course website for important announcements, documents, reading and homework assignments, and other helpful information.

AMERICANS WITH DISABILITIES ACT COMPLIANCE

Students with disabilities who believe that they may need accommodations in this class are encouraged to contact the ATTIC counselor working with disabilities at 678-915-7316, now in the Basement of the Student Center, as soon as possible to better ensure that such accommodations are implemented in a timely fashion. Accommodations are best implemented at the beginning of the semester. I will work with you to provide reasonable accommodations to ensure that you have a fair opportunity to perform and participate in class.