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| **1. Course title/number, number of credit hours** | | |
| EGN 4323 Vibration Synthesis and Analysis | | 3 credit hours |
| **2. Course prerequisites, corequisites, and where the course fits in the program of study** | | |
| 1. MAP 3305 Engineering Mathematics I or MAP 2302 Differential Equations  2. EGN 3321 – Dynamics | | |
| **3. Course logistics** | | |
| *Term*: Fall 2015  This is a classroom lecture course  *Class location and time*  This course has no design content. | | |
| **4. Instructor contact information** | | |
| *Instructor’s name*  *Office address*  *Office Hours*  *Contact telephone number*  *Email address* | Dr. Stewart Glegg, Professor  Engineering West (EG-36) Bldg., Room 185  MW: 3-4 PM  561-297-2633  sglegg@fau.edu | |
| **5. TA contact information** | | |
| *TA’s name*  *Office address*  *Office Hours*  *Contact telephone number*  *Email address* | N/A | |
| **6. Course description** | | |
| Free and forced vibration of mechanical systems; damping; periodic and transient excitations; two degree of freedom, and continuous systems. | | |
| **7. Course objectives/student learning outcomes/program outcomes** | | | |
| *Course objectives* | To introduce the students to basic theory and applications of mechanical vibration analysis. Emphasis is on modeling and analysis techniques as well as engineering insights in treating practical mechanical vibration problems. | | |
| *Student learning outcomes*  *& relationship to ABET a-k objectives* | 1. The students will be well aware of the notion of free vibration in the context of the single degree of freedom system. (a,e,k)  2. The students will be familiar with harmonically excited vibrations for the single degree of freedom system. (a,e,k)  3. The students will be familiar with transient vibration under general forcing conditions. (a,e,k)  4. The students will learn two-degree of freedom systems’ basic notions including determination of the frequencies and mode shapes. (a,e,k)  5. The students will learn flexural vibrations of beams and effect of boundary conditions. (a,e,k)  6. The student will be able to effectively communicate by writing a report. (g) | | |
| **8. Course evaluation method** | | | |
| Project - 35 %  Examinations - 65 % | | *Note*: The minimum grade required to pass the course is C. | |
| **9. Course grading scale** | | | |
| Grading Scale:  A: 95-100, A-: 90-95, B+: 85-90, B: 80-85, B-: 75-80, C+: 70-75, C: 65-70, C-: 60-65, D+: 55-60, D: 50-55, D-: 45-50, F: 0-45. | | | |
| **10. Policy on makeup tests, late work, and incompletes** | | | |
| *Makeup tests* are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exam should be administered and proctored by department personnel unless there are other pre-approved arrangements  *Incomplete grades* are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation incomplete grades will not be given. | | | |
| **11. Special course requirements** | | | |
| 1. All students registered in the regular session are required to attend the class, and sign in for each class. Each student is allowed to have two absences, and one point toward the final score (1%) will be deducted for each additional absence.  2. The project report will be collected on the due date. No late submission is accepted.  3. Written proofs are required for special situations for absences and late submission of the project report, and they must be submitted within one week.  4. Students must report the discrepancies between the scores posted in the Blackboard and appearing on the report and exam papers within two weeks after they are posted in the Blackboard. Afterwards, the scores will not be changed. | | | |
| **12. Classroom etiquette policy** | | | |
| University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions. | | | |
| **13. Disability policy statement** | | | |
| In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton campus, SU 133 (561) 297-3880 and follow all OSD procedures. | | | |
| **14. Honor code policy** | | | |
| Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at  [www.fau.edu/regulations/chapter4/4.001\_Code\_of\_Academic\_Integrity.pdf](http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf) | | | |
| **15. Required texts/reading** | | | |
| Mechanical Vibrations by Rao, Prentice Hall, 5th edition 2013, or equivalent text at the discretion of the instructor, and/or lecture notes | | | |
| **16. Supplementary/recommended readings** | | | |
| N/A | | | |
| **17. Course topical outline, including dates for exams/quizzes, papers, completion of reading** | | | |
| **Topics**:  1. Review of analytical preliminaries.  2.Single-degree-of-freedom systems: reduction of degrees of freedom; D’Alembert’s  principle; un-damped free vibration; resonance; damped free vibration,  logarithmic decrement.  3. Response to harmonic excitation; resonance; damped one –degree-of-freedom  system.  4. Response to impulse loads.  5. Response to arbitrary dynamic loading: Duhamel’s integral.  6. Free vibrations of two degree-of-freedom systems. Anti-resonance; concept of vibration isolation.  7. Derivation of vibration equation of beams.  8. Effect of boundary conditions.  **Additional topics at the discretion of the Lecturer** (examples follow)  9. Vibration in presence of axial load.  10. Vibration of two-span beams.  11. Concept of functionally graded materials (FGM); vibration of FG beam.  12. Vibration synthesis.  13. Vibration Measurement | | | |