MENG331 – Dynamics of Machinery

Eastern Mediterranean University
Faculty of Engineering

Department:
Mechanical Engineering

Program Name: Mechanical Engineering	**Program Code:** 23

Course Code:	**Course Title:**	**Credits:**	**Year/Semester:**
MENG331	Dynamics of Machinery	4 Cr	2018-2019 Fall

☒ Engineering or Area Core
☐ Engineering Course offered by other programs
☐ Engineering or Area Elective
☐ Mathematics and Basic Sciences
☐ General Education

Prerequisite(s): MENG233 or MENG231 and MATH207 or MATH241

Catalog Description:
Mechanical vibrations: 2-DOF vibrating systems, vibration measuring instruments, numerical methods for multi-degree of freedom systems, Dunkerley's equations, vibration of continuous systems, random vibrations. Balancing of machinery: rigid rotors, reciprocating machines, flywheels, planar linkages, balancing machines and instrumentation. Cam dynamics, gyroscope and governors.

Instructor Name:	**Office no:**	**Office Tel:**
Associate Professor Dr Qasim Zeeshan	ME141	6301361

Course Web Page:
https://staff.emu.edu.tr/qasimzeeshan/en

Textbook(s):
Mechanical Vibrations by Rao Singiresu (5th Edition) - Pearson Publications.
Mechanical Vibrations by William Palm (1st Edition) - Wiley Publications.
Design of Machinery by Robert L. Norton (5th Edition) - McGraw Hill.
Kinematics and Dynamics of Machinery by Robert L. Norton SI Edition- McGraw Hill.

Indicative Basic Reading List :

Topics Covered and Class Schedule:
(4 hours of lectures and 1 hour of tutorial and lab per week)
Week 1 Fundamentals of Vibration
Week 2 Free Vibration of Single Degree of Freedom Systems
Week 3 Harmonically Excited Vibration
Week 4 Harmonically Excited Vibration
Week 5 Two-Degree of freedom systems
Week 6 Two-Degree of freedom systems
Week 7 Revision
Weeks 8-10 **Mid-Term Examination**
Week 11 Vibration Measurement and Applications
Week 12-13 Modal Analysis
Week 14 Vibration Control
Week 14-15 Revision
Week 15 **Final Examination**

<table>
<tr><th colspan="2">Lecture and Tutorial Learning Outcome</th><th>Student Outcomes</th><th>Performed Assessments and Percentage</th></tr>
<tr><td colspan="2">• Understand the fundamentals of vibration.
• Understand equivalent spring & Mass system.
• Understand the free response of one-degrees of freedom system.
• Understand the response of one-degree freedom systems with damping.
• Understand the response of two-degree freedom systems.
• Understand the mode shapes of two-degree freedom systems.
• Understand the fundamental of vibration measurement in the real world.</td><td>a, e</td><td>Midterm Exam: 30%
Homework: 5%
Quiz: 5%
Project: 10%
Final Examination: 40%</td></tr>
<tr><th>Lab. Experiment Title and Lab. Equipment Used</th><th>Lab Learning Outcome</th><th>Student Outcomes</th><th>Performed Assessments and Percentage</th></tr>
<tr><td>Lab #1- Determination of the stiffness of two different springs</td><td>2 .Understand equivalent spring & Mass system.</td><td rowspan="4">b</td><td rowspan="4">Lab Works and Lab Attendance %10</td></tr>
<tr><td>Lab #2- Determination of moment of inertia</td><td>1. Understand the fundamentals of vibration.</td></tr>
<tr><td>Lab #3- Damped free vibrations</td><td>3 .Understand the free response of one-degrees of freedom system.
4 .Understand the response of one-degree freedom systems with damping.</td></tr>
<tr><td>Lab #4- Mode shape analysis of cantilever beam with ANSYS

Lab #5: Static and Dynamic Balancing of shafts</td><td>7.Understand the fundamental of vibration measurement in the real world.</td></tr>
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Contribution of Course to Criterion 5

Credit Hours for:
Mathematics & Basic Science : 0
Engineering Sciences and Design : 4
General Education : 0

Important Notes:

University rules and regulations are applied to this course. **For details, please see** http://mevzuat.emu.edu.tr

1. **"NG" Nil Grade/ Failing from Absenteeism:** Students who do not comply with the required level attendance and/or not fulfilling the requirements for the evaluation of the course are given the "NG" grade by the Instructor of the Course based on the criteria determined by the Faculty/School Academic Council. Students are informed about the criteria for receiving the "NG" grade by the related course instructor at the beginning of the semester. "NG" grade is included in the computation of GPA and CGPA.
2. Student attendance is monitored and assessed by the course instructor. A student who fails to meet the requirements of a course or who is absent more than the limit specified by the Faculty or School is considered to be unsuccessful in that course.
3. Students who do not attend any of the above assessment activities (such as mid-term exam, lab exam, homework, design project report etc.) will be given NG (Nil Grade).
4. Late Submissions of the Assignments, Lab Reports and Project will be graded as zero.

MAKE-UP EXAM:

1. There is no make-up or resit for the Quiz and Labs.
2. A student who fails to sit for an examination for a valid reason is given a make-up exam. Within three working days after the examination, students who wish to take a make-up must submit a **written statement** to the course instructor explaining the reason(s) for his/her request.
3. Eligibility to take a **Make-Up Exam**:
    a. Student must contact the Instructor immediately within "**three working days**" after the examination when (s)he has missed the mid-term exam or final exam and to discuss with the faculty about the date and time to take the make-up exam.
    b. Student must secure a "**Make-Up Exam Form**" from the department Office or from instructor website & fill-out the Form. For each Make-Up Exam, please use separate Form.
    c. Student must secure the approval from the instructor for taking the Make-Up Exam.
    d. Failure to take the Make-Up Exam at the agreed date and time will lead to a "NG" Grade for the Make-Up Exam, midterm or final.