

Request for Graduate Course Addition

1. Prepare one paper copy with all signatures and supporting material and forward to the Graduate Council Chair.
2. E-mail one identical PDF copy to the Graduate Council Chair. If attachments included, please merge into a single file.
3. **The Graduate Council cannot process this application until it has received both the PDF copy and the signed hard copy.**

College: CITE

Dept/Division: Engineering

Alpha Designator/Number: ME- 635

 Graded CR/NC

Contact Person: Gang Chen

Phone: 696-3204

NEW COURSE DATA:

New Course Title: Advanced Vibrations

Alpha Designator/Number:

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Title Abbreviation:

A	d	v	a	n	c	e	d			V	i	b	r	a	t	i	o	n	s				
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(Limit of 25 characters and spaces)

Course Catalog Description:
(Limit of 30 words)

Modeling of vibratory motion of advanced mechanical and structural systems, including continuous systems, nonlinear systems and systems with random excitations.

Co-requisite(s): None

First Term to be Offered: Spring-2016

Prerequisite(s): Graduate Status

Credit Hours: 3

Course(s) being deleted in place of this addition (*must submit course deletion form*):

Signatures: if disapproved at any level, do not sign. Return to previous signer with recommendation attached.

Dept. Chair/Division Head _____	Date _____
Registrar _____	Date _____
College Curriculum Chair _____	Date _____
Graduate Council Chair _____	Date _____

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College: CITE

Department/Division: ENGINEERING

Alpha Designator/Number: ME-635

Provide complete information regarding the new course addition for each topic listed below. Before routing this form, a complete syllabus also must be attached addressing the items listed on the first page of this form.

1. FACULTY: Identify by name the faculty in your department/division who may teach this course.

Gang Chen

2. DUPLICATION: If a question of possible duplication occurs, attach a copy of the correspondence sent to the appropriate department(s) describing the proposal. Enter "**Not Applicable**" if not applicable.

Not Applicable

3. REQUIRED COURSE: If this course will be required by another department(s), identify it/them by name. Enter "**Not Applicable**" if not applicable.

None

4. AGREEMENTS: If there are any agreements required to provide clinical experiences, attach the details and the signed agreement. Enter "**Not Applicable**" if not applicable.

Not Applicable

5. ADDITIONAL RESOURCE REQUIREMENTS: If your department requires additional faculty, equipment, or specialized materials to teach this course, attach an estimate of the time and money required to secure these items. (Note: Approval of this form does not imply approval for additional resources.) Enter "**Not Applicable**" if not applicable.

None

6. COURSE OBJECTIVES: (May be submitted as a separate document)

Please refer to the attached syllabus

7. COURSE OUTLINE (May be submitted as a separate document)

Please refer to the attached Syllabus

8. SAMPLE TEXT(S) WITH AUTHOR(S) AND PUBLICATION DATES (May be submitted as a separate document)

Mechanical Vibrations, 4th Ed, S. Rao, Prentice Hall, 2009.

Mechanical Vibrations: Theory and Applications, 1st Edition, Kelly, S. Graham, Cengage Learning, 2011

Any text on advanced mechanical vibrations

Journal of Sound & Vibrations

9. EXAMPLE OF INSTRUCTIONAL METHODS (Lecture, lab, internship)

Lecture

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10. EXAMPLE EVALUATION METHODS (CHAPTER, MIDTERM, FINAL, PROJECTS, ETC.)

Mid-term exams 45%

HW & Projects: 25%

Final Exam: 30%

11. ADDITIONAL GRADUATE REQUIREMENTS IF LISTED AS AN UNDERGRADUATE/GRADUATE COURSE

None

12. PROVIDE COMPLETE BIBLIOGRAPHY (May be submitted as a separate document)

Mechanical Vibrations, 4th Ed, S. Rao, Prentice Hall, 2009.

Mechanical Vibrations: Theory and Applications, 1st Edition, Kelly, S. Graham, Cengage Learning, 2011

Any text on advanced mechanical vibrations

Journal of Sound & Vibrations

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Please insert in the text box below your course summary information for the Graduate Council agenda. Please enter the information exactly in this way (including headings):

Department:

Course Number and Title:

Catalog Description:

Prerequisites:

First Term Offered:

Credit Hours:

Department: Weisberg Division of Engineering

Course Number and Title: ME 635 Advanced Vibrations

Catalog Description:

Modeling of vibratory motion of advanced mechanical and structural systems, including continuous systems, nonlinear systems and systems with random excitations.

Prerequisite: graduate status

First year Offered: Spring 2016

Credit Hours: 3

Marshall University Syllabus

Course Title/Number	Advanced Vibrations, ME635
Semester/Year	Spring / 2016
Days/Time	MWF / 11:00 – 11:50 am
Location	Weisberg Engineering Lab 101 Classroom
Instructor	Gang Chen
Office	Weisberg Engineering Lab Room 109c Division of Engineering College of Information Technology and Engineering Marshall University Huntington, WV 25755
Phone	304-696-3204
E-Mail	chenga@marshall.edu
Office/Hours	MWF: 12:00-2:00pm For those of you who will not be able to meet the instructor during the assigned office hours, you are welcome to come and ask instructor by appointment or at an appropriate time.
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

Catalog Course Description

Modeling of vibratory motion of advanced mechanical and structural systems, including continuous systems, nonlinear systems and systems with random excitations.
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Table: How each student learning outcomes will be practiced and assessed in the course.

Course Student Learning Outcomes	How students will practice each outcome in this Course	How student achievement of each outcome will be assessed in this Course	Program outcomes
Students will be able to	Lectures, In-class discussions, in-	Questions in class, the	a2,e2

understand the concepts of advanced vibration systems and modeling	class excises, homeworks	evaluations of homework and examination problems.	
Students will be able to model and solve for continuous systems, string, rod, shaft and beam	Lectures, In-class discussions, in-class excises, homeworks	Questions in class, the evaluations of homework and examination problems.	a2,e2
Students will be able to analysis nonlinear vibration systems	Lectures, In-class discussions, in-class excises, homeworks	Questions in class, the evaluations of homework and examination problems.	a2,e2
Students will be able to analyze mechanical system under random excitations	Lectures, In-class discussions, in-class excises, homeworks	Questions in class, the evaluations of homework and examination problems.	a2,e2

Objective:

After taking this course, students should be able to

- Understand complex vibration systems.
- Develop dynamics models and solve for continuous system.
- Develop dynamics models and solve for nonlinear system
- Develop dynamics models and solve for randomly excited system

Required Texts, Additional Reading, and Other Materials

Mechanical Vibrations, 4th Ed, S. Rao, Prentice Hall, 2009. New York, USA, 2010, Mechanical Vibrations: Theory and Applications, 1st Edition, Kelly, S. Graham Any text on advanced mechanical vibrations Journal of Sound & Vibrations
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Course Requirements / Due Dates

<p>Course Requirements : Attendance/Homework /Examinations</p> <p>TEST SCHEDULE:</p> <p>Hourly Exam #1</p> <p>Hourly Exam #2</p> <p>Hourly Exam #3</p> <p>Final Exam (two hours)</p>
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Homework due Dates:

- ❖ Homework will regularly be assigned either during the class time or by e-mail/blackboard.
- ❖ Checking your e-mail is required on a daily-basis for information regarding homework assignment. Homework must be submitted before the starting time of class on the assignment date.
- ❖ Late homework is acceptable for an excused absence. For unexcused delay submission, there will be a 20% late penalty for each day it is late--starting with a 20% penalty on the first day if it is not turned in at the beginning of class. After 5 days, it will not be accepted at all.
- ❖ No late homework will be accepted after the final day of classes for the semester.
- ❖ You are expected to provide your homework on engineering papers - not a Xerox copy.
- ❖ Homework must be neat, readable, and must conform to acceptable Standards of Engineering Computation.

Grading Policy

Exams:

Three exams and a final exam will be given during the course of the semester. Exams will be closed book and closed notes. No makeup exams will be given with the exception of unusual circumstances (institutional excuse, severe injuries, family emergencies, group activities etc.).

Grading Policy:

Homework and Attendance	25% (attendance 10%)
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	30%

<i>Total</i>	100%

Letter Grade Scale:

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

The instructor does reserve the right to slightly curve or scale the grades based on class groupings/performance.

Attendance Policy

The attendance policy will follow University's excused absence policy.

You are expected to attend all classes. However, the instructor accepts your absence for one session provided that an advance notice will be given, unless this is an excused absence such as institutional excuse, severe injuries, family emergencies, group activities etc.

Course Schedule:

LECTURE SUBJECT Schedule & TEXT REFERENCE

1. Introduction of Advanced Mechanical Vibrations
2. Continuous systems: string, rod, shaft and beam
3. Nonlinear systems:
 - Duffing Eq.,
 - Mathieu Eq.,
 - van der Pol Eq.
 - Analysis method
4. Mechanical vibration systems under random excitation.
 - random process
 - Correlation analysis, Power spectrum density
 - System response

** The instructor reserves the right to slightly change the topics and their order to achieve the maximum benefit of the course learning outcomes.*

Course Prerequisites:

Graduate Status