Wilkes University Curriculum Committee
PROPOSAL SUBMITTAL FORM

Directions:

- Use this set of forms for all proposals sent to the Curriculum Committee.
- Pages 1-3 of this document are required. Any unnecessary forms should be deleted from the packet before submissions. If multiple forms are needed (course addition, course deletion, etc), simply copy and paste additional forms into this packet.
- Note that all new programs (majors and minors), program eliminations, significant program revisions and all general education core revisions must be reviewed and approved by the Provost and Academic Planning Committee (APC) prior to submission to the Curriculum Committee. The Provost will make the decision if a program revision requires APC review.
- Completed and signed forms are due no later than the second Tuesday of every month. Submit one signed original hard copy and a scanned electronic copy with all signatures to the Chair of the Curriculum Committee.

1. Originator: Edward T. Bednarz III, Ph.D.
   Associate Professor
   Department of Mechanical Engineering and Engineering Management
   (570)408-7913 / Edward.Bednarz@Wilkes.edu

2. Proposal Title: Vibrations Lab and Technical Electives

3. Check only one type of proposal: (double click on the appropriate check box and change default value to “checked”). Each different type of proposal must be submitted on a separate form.

   - [ ] New Program. (Major or Minor Degree Programs). This requires prior review and approval by the Provost and APC. Major = minimum of 30 credits, minor = minimum of 18 credits.
   - [ ] New Concentration, Track, or Certificate. The Provost determines if review and approval by APC is necessary. Concentration – minimum of 12 credits, certification, endorsement and track are discipline specific.
   - [ ] Elimination of Program. (Major or Minor Degree Programs). This requires prior review and approval by the Provost and APC.
   - [ ] Elimination of Concentration, Track, or Certificate. The Provost determines if review and approval by APC is necessary.
   - [x] Program Revision. Significant revisions to a program require review and approval by the Provost. The Provost determines if review and approval by APC is necessary.
   - [ ] General Education Revision. Submissions only accepted from the General Education Committee (GEC). Must be reviewed and approved by the Provost.
   - [ ] Creation of new departments, elimination of existing department. This requires prior review and approval by the Provost and APC.
   - [ ] Course additions or deletions not affecting programs (such as elective courses, transition of “topics” courses to permanent courses).
   - [ ] Change in course credit or classroom hours.
   - [ ] Incidental Changes. Includes changes in course/program title, course descriptions, and course prerequisites. (Although these changes do require approval by the Curriculum Committee, they do not go before the full faculty for approval).
   - [ ] Other (Specify)

Indicate the number of course modification forms that apply to this proposal:

1. Course Addition Form (Attach Syllabi: refer to Faculty Handbook for requirements)
2. Course Deletion Form
3. Course Change Form

Revised 4/30/2018
4. Executive Summary of Proposal.

Briefly summarize this proposal. The breadth and depth of this executive summary should reflect the complexity and significance of the proposal. Include an overview of the proposal, background and reasoning behind the proposal and a description of how the proposal relates to the mission and strategic long-range plan of the unit and/or university. For incidental changes a one or two sentence explanation is adequate.

Consistent with the continuous improvement recommendation from our accrediting agency, ABET, the Mechanical Engineering Department has done a full evaluation of required technical electives. Currently, three technical electives exist. As part of this proposal, two courses would be required to contain the ME prefix at the 200 level or above. The remaining course would be any math, science or engineering prefix at the 200 level or above. This would allow the students to obtain depth and breadth within the Mechanical Engineering program.

In addition, the Mechanical Engineering Department is creating a one credit Vibrations Lab. Currently there is a three credit Vibrations course in which the lecture and lab are both being covered. By creating a new dedicated lab, there will be more time available during lecture to properly cover the theory. Students will then be able to conduct experiments, analyze data and prepare reports in a dedicated hands-on lab. The physical lab already exists so no new resources are required.

As part of ABET compliance, the Mechanical Engineering program needs a minimum of 30 science/math credits. With the addition of the Vibration Lab and to maintain the program’s 130 credit total, one credit of PHY 206 or CHM 258 laboratories will be removed from the required curriculum. Currently students are asked to pick either PHY 203/206 or CHM 256/258. With this proposal, students will be given the opportunity to take a three credit math or science course from a specific list given. The program will be at 31 science/math credits so is still ABET compliant.

5. Other specific information. (Not applicable for incidental changes.)

What other programs, if any, will be affected by this proposal? Describe what resources are available for this proposal. Are they adequate? What would be the effect on the curriculum of all potentially affected programs if this proposal were adopted? Include any potential effects to the curriculum of current programs, departments and courses.

No other programs are affected by this proposal.

Revised 4/17/2018
6. Program Outline. (Not applicable for incidental changes).

A semester-by-semester program outline as it would appear in the bulletin for a new program or any modified program with all changes clearly indicated.

Please see the attached semester by semester listing for specific courses as well as the proposed flowchart.

2 courses – ME Tech. Elec. *
1 course – Tech. Elec. **
1 course – Sci. Elec. ***

* Mechanical Engineering technical elective at 200 level or above
** Math/Science/Engineering technical elective at 200 level or above
*** Math/Science technical elective from approved list in bulletin

The list for math/science electives that will appear in the bulletin will be:
CHM 256, EES 211, EES 240, GEO 211, MTH 214, MTH 231, MTH 314, MTH 351, MTH 361, MTH 362, PHY 203, PHY 312, PHY 374, PHY 377.

7. New Program Assessments: (For new programs ONLY)

All new major programs reviewed through the Curriculum Committee must complete this section. Please consult the following page for guidance in developing an assessment plan: https://wilkes.edu/about-wilkes/university-committees/assessment/assessment-planning.aspx

a. Please list program-level student learning outcomes (SLOs) that all program majors should be able to demonstrate upon graduation from the program. SLOs should be worded such that student performance can be measured directly.

N/A

b. Please briefly describe current plans for how student performance on each program-level SLO will be assessed. Be sure to answer where (which courses), when (frequency), and how (assessment method) for each SLO.

N/A

c. Please identify by name any external accreditation agency or agencies that will influence assessment planning. Include standards or requirements from that accreditor that must be followed when developing the program’s assessment plan. You are encouraged to share specific, current web links to relevant content when standards or requirements related to assessment are substantial.

N/A

Revised 4/17/2018
8. Signatures and Recommendations. (please date)
   - Signatures of involved Department chair(s) and Dean(s) indicate agreement with the proposal and that adequate resources (library, faculty, technology) are available to support proposal.
   - If a potential signatory disagrees with a proposal he/she should write “I disagree with this proposal” and a signed statement should be attached to this submission.

   **Henry J. Castejon / chair**  **2/28/19**
   Print Name/Title  Signature  Date

   Department chair(s) of all potentially affected programs – Dr. Henry Castejon, Mechanical Engineering and Engineering Management

   **PRAHLAD MURTHY**  **3/1/19**
   Print Name/Title  Signature  Date
   Interim Dean, CSE

   Dean(s) of any potentially affected College/School – Dr. Prahlad Murthy, CSE

   **Susan Hritzak**  **3/1/19**
   Print Name  Signature  Date
   Registrar – Susan Hritzak

   **Sarah Skleder**  **3/1/19**
   Print Name  Signature  Date
   Provost – Dr. Anne Skleder (For new programs, significant revisions and revisions to the General Education Program revisions only).
   Provost should check here ___ if this proposal is a program revision AND the significance of the revision requires review and approval by APC prior to Curriculum Committee.

   **Chair, Academic Planning Committee**
   For new programs, program revisions sent via the provost. Signature indicates that the proposal has been reviewed and approved by APC.

Revised 4/17/2018
1. Course Title: **Vibrations Lab**

2. Course Number: ME 334

3. Course Credits: 1

   Classroom Hours ____  Lab Hours 2 ____ Other ____

4. Course Pre-requisites: ME 234, MTH 211

5. Course Co-requisites: ME 332

6. Effective Date of Addition (semester/year)  Summer 2019

7. Course Description (as proposed for the Bulletin):  
   Course descriptions provide an overview of the topics covered. If the course is offered on a scheduled basis, i.e. every other year, or only during a set semester, note this in the description. Course descriptions should be no more than two to three sentences in length.

   Experiments that complement vibration theories in ME-332, including spring and damper elements, underdamped vibration, torsional pendulum, resonance, transient and steady-state behaviors, base excitation, rotating unbalance, impulse response, and modal testing.

8. Required Documentation:
   *Proposed Syllabus*  Attach proposed syllabi immediately after this document. In some situations the official syllabus may contain information which is beyond the review needs of the Curriculum Committee (such as extensive rubrics, etc). It is permissible to attach an abbreviated syllabus. In general, syllabi (whether full or abbreviated) should contain the following information: Course Title, Course Number, Credit hours, Faculty Information (name contact information, office hours), Course Description, Course Outcomes or Objectives, Assessment (grading) informations, required texts (or other things such as tools, software, etc), pertinent policies and a proposed schedule of topics.
A. GENERAL INFORMATION:

Instructor: Dr. Kai Wu, Visiting Assistant Professor of Mechanical Engineering
Contact Info: Office: SLC-166, Office hours: To Be Determined
Phone: 570-408-6980, E-Mail: kai.wu@wilkes.edu

B. CATALOG DESCRIPTION:

Experiments that complement vibration theories in ME-332, including spring and damper elements, underdamped vibration, torsional pendulum, resonance, transient and steady-state behaviors, base excitation, rotating unbalance, impulse response, and modal testing.
Prerequisites: ME-234, MTH-211
Co-requisite: ME-332

C. LEARNING OBJECTIVES:

This course provide students with a comprehensive understanding of the notion of vibration of mechanical systems and techniques used in problem solving. Provide students with:

1. Ability to determining equation of motion for both free and forced vibration (a, e).
2. Ability to determination of the response(s) of the system (a, e).
3. Ability to determination of the natural frequency(s) of the system(s) (a, e).
4. Ability to distinguish between underdamped, overdamped, and critically damped systems (a, e).
5. Ability to distinguishing between types of forces that set a system to motion (a, e).
6. Ability to design of a system for vibration and vibration isolator (a, e).
7. Ability to determining the modal shapes of a system of two or more Degree of Freedom (a, e).
8. Ability to develop laboratory report (g).
9. Ability to use instruments to conduct testing, data collecting, and interpreting data (k, b).

D. ABET CRITERIA OUTCOMES:

The Accreditation Board for Engineering and Technology (ABET) Criteria 2000 define a number of program outcomes that all graduates of ABET accredited Engineering programs must have. These outcomes are required of all B.S. in engineering graduates and are listed below:

"All graduates of the engineering programs must demonstrate:

a. an ability to apply knowledge of math, engineering and science
b. an ability to design and conduct experiments and to analyze and interpret data
c. an ability to design a system, component, or process to meet desired needs
d. an ability to function on multidisciplinary teams"
e. an ability to identify, formulate, and solve engineering problems

f. an understanding of professional and ethical responsibility

g. an ability to communicate effectively

h. the broad education necessary to understand the impact of engineering solutions in a global/societal context

i. a recognition of the need for an ability to engage in lifelong learning

j. a knowledge of contemporary issues

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.”

ME-334 is designed to address many, but not all, of these outcomes. The specific course outcomes anticipated by successful completion of ME-334 are listed below. This statement of course objectives will give you a broader perspective on the overall objectives of the course.

Outcomes a, and e: are also key to this course. The lab reports will emphasize the application of various basic science and engineering concepts used in quantitative and qualitative analyses of engineering systems.

Outcomes b, d and k: will be addressed with hands-on laboratory experiments including data collection and analysis. Student teams work on each experiment, however, each student will submit own weekly report.

Outcome g: will be addressed in written form laboratory reports.

E. TENTATIVE TOPICS:

1. Spring Element
   (a) Spring constant’s coil radius and length dependence
   (b) Springs in series and parallel
   (c) Ideal spring behavior

2. Damper Element
   (a) Viscous and friction damping
   (b) Magnetic damping on an inclined track
   (c) Pendulum damping and vibration absorption

3. Underdamped Vibration
   (a) Spring-mass system with cardboard damper
   (b) Cantilevered beam modeled as spring-mass system

4. Torsional Vibration
   (a) Damping in torsional pendulum using ballistic galvanometer
   (b) Torsion constant and frequency behavior
   (c) Viscous and friction underdamping in torsional pendulum

5. Resonance
   (a) Resonance in spring-mass system
(b) Resonance in mass driven upright vertical beam

6. Transient and Steady-State Behaviors
   (a) Initial transient and beat frequency behavior
   (b) Steady-state behavior and displacement transmissivity

7. Base Excitation
   (a) Base driven tall buildings

8. Rotating Unbalance
   (a) Vibration and rotating unbalance theory
   (b) Vibration reduction and displacement transmissivity

9. Impulse Response
   (a) Impulse effect
   (b) Underdamped response under impulse excitation

10. Modal Testing
    (a) Responses of multiple degree of freedom spring-mass systems
    (b) Nodal point in a string (1D) and nodal line in a membrane (2D)
    (c) Natural frequency and mode shape of a metal beam
    (d) Damage detection

F. GRADING POLICY:
   Attendance  10%
   Quizzes  10%
   Lab Reports  60%
   Design Project  20%

There are four components in the final grade: attendance, quizzes, lab reports, and a design project. Attendance is mandatory and contributes to 10% of the final grade. It is assessed by a sign-in sheet for each lab session, and three sessions absentee will receive a zero final grade for the course. Students are required to preview lab manuals before coming to the corresponding lab sessions, a short quiz will be given each time to assess their lab preparation, which contributes to 10% of the final grade. Lab reports will constitute 60% of the final grade. All reports must be turned in individually at the beginning of class on the due date to receive full credit, and late reports will receive only partial credit. Students' reports should be a clear presentation of their performance and demonstrating their knowledge, all the work should be shown. The cover page, paragraphs, tables, and figures should be neat and well organized. Finally, there is a design project for the students near the end of the semester to exam their ability to design and conduct an experiment and analyze the corresponding data using existing equipment in the laboratory. The design project constitutes 20% of the final grade.

The eight numerical grades for academic achievement are given as follows:
$> 90.0\% = 4.0$
$85.0\% - 89.9\% = 3.5$
$80.0\% - 84.9\% = 3.0$
$75.0\% - 79.9\% = 2.5$
$70.0\% - 74.9\% = 2.0$
$65.0\% - 69.9\% = 1.5$
$60.0\% - 64.9\% = 1.0$
$< 60.0\% = 0.0$

G. ACADEMIC INTEGRITY

Plagiarism is illegal, unethical, and will not be tolerated in any form. Any evidence of this act will be handled according to Wilkes University protocol.
## Wilkes University
### Mechanical Engineering Curriculum

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Credits</th>
<th>Second Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ME 180 CADD Lab</td>
<td>1</td>
<td>ME 140 Scientific Programming</td>
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<tr>
<td>CHM 118 Chemistry for Engineers</td>
<td>3</td>
<td>EGR 200 Introduction to Materials Science</td>
<td>3</td>
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<td>CHM 117 Chemistry for Engineers Lab</td>
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<td>MTH 112 Calculus II</td>
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<tr>
<td>MTH 111 Calculus I</td>
<td>4</td>
<td>PHY 201 Physics I</td>
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<td>ENG 101 English Composition</td>
<td>4</td>
<td>PHY 204 Physics I Laboratory</td>
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<tr>
<td>FYF 101 First Year Foundations</td>
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<td>General Education</td>
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**Total Credits: 16**

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<tr>
<th>Third Semester</th>
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<tr>
<td>MTH 211 Introduction to Differential Equations</td>
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<td>EGR 222 Mechatronics</td>
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<tr>
<td>PHY 202 Physics II</td>
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<td>ME 232 Strength of Materials</td>
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<td>PHY 205 Physics II Laboratory</td>
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<td>ME 234 Dynamics</td>
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<td>EE 211 Electrical Circuits and Devices</td>
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<td>ME 322 Engineering Thermodynamics</td>
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<td>EE 283 Electrical Measurement Lab</td>
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<td>MTH 212 Multivariable Calculus</td>
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<td>ME 231 Statics</td>
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<td>ME 175 Intro. to Manufacturing and Machining</td>
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**Total Credits: 18**

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<th>Fifth Semester</th>
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<th>Sixth Semester</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ME 321 Fluids Mechanics</td>
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<td>Co-op Education or ME Technical Elective*</td>
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<tr>
<td>ME 333 Machine Design I</td>
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<td>EGR 201 Professionalism and Ethics</td>
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<td>ME 215 Intro. to Manufacturing Processes</td>
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<td>EGM 320 Engineering Project Analysis</td>
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<td>ME 335 Engineering Modeling and Analysis</td>
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<td>ME 332 Mechanics of Vibrations</td>
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<td>ME 334 Mechanics of Vibrations Lab</td>
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<td>ME 323 Fluid Mechanics Lab</td>
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<td>ME 324 Heat and Mass Transfer</td>
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**Total Credits: 18**

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<td>ME 317 Robotics</td>
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<td>ME Technical Elective*</td>
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<td>Science Elective**</td>
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<td>ME 392 Senior Project II</td>
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<tr>
<td>ME 326 Heat Transfer Lab</td>
<td>1</td>
<td>Technical Elective***</td>
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<td>ME 384 Mechanical Design Lab</td>
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<td>Free Elective</td>
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<td>ME 391 Senior Project I</td>
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**Total Credits: 14**

*ME Technical Elective at 200 level or above. **Math/Science elective from approved list. ***Math/Science/Engineering elective at 200 level or above.

This chart is for illustration purposes only. See Undergraduate Bulletin for specific requirements.
The requisites of a course's requisite are requisites of the course. Solid lines indicate prerequisite and dashed lines corequisite.