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| For Academic Affairs and Research Use Only | |
| Proposal Number |  |
| CIP Code: |  |
| Degree Code: |  |

**New or Modified Course Proposal Form**

**[ ] Undergraduate Curriculum Council**

**[X] Graduate Council**

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| --- |
| **[X]New Course, [ ]Experimental Course (1-time offering), or [ ]Modified Course (Check one box)** |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date… **Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **COPE Chair (if applicable)** |
| Shivan Haran 4/7/2022 **Department Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Head of Unit (if applicable)** |
| Brandon Kemp 4/1/2022  **College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Undergraduate Curriculum Council Chair** |
| Mary Elizabeth Spence 4/1/2022 **Office of Assessment (new courses only)** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **Graduate Curriculum Committee Chair** |
| Abhijit Bhattacharyya 4/7/2022 **College Dean** | Alan Utter 4/25/2022  **Vice Chancellor for Academic Affairs** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Enter date…  **General Education Committee Chair (if applicable)** |  |

1. **Contact Person (Name, Email Address, Phone Number)**

**Shivan Haran; sharan@astate.edu; (870) 972-3413**

1. **Proposed starting term and Bulletin year for new course or modification to take effect**

**Spring 2023; 2022-23 Bulletin**

**Instructions:**

*Please complete all sections unless otherwise noted. For course modifications, sections with a “Modification requested?” prompt need not be completed if the answer is “No.”*

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|  | **Current (Course Modifications Only)** | **Proposed (New or Modified)**  *(Indicate “N/A” if no modification)* |
| **Prefix** |  | **ME** |
| **Number\*** |  | **5513\*-Updated to 5533 on 4/22/2022 at direction of Registrar’s Office.** |
| **Title**  (include a short title that’s 30 characters or fewer) |  | **Fundamentals of Acoustics and Noise** |
| **Description\*\*** |  | **Fundamentals of acoustics, terminology, wave propagation, measurement and analysis of sound, reflection and transmission through plane interface and waveguides. Quantifying and assessment of noise, sound levels, sources, sound absorption and transmission, Noise control methods and standards. Irregular** |

***\**** Confirm with the Registrar’s Office that number chosen has not been used before and is available for use. For variable credit courses, indicate variable range. *Proposed number for experimental course is 9*.

\*\*Forty words or fewer (excepting prerequisites and other restrictions) as it should appear in the Bulletin.

1. **Proposed prerequisites and major restrictions** **[Modification requested? Yes/No]**

(Indicate all prerequisites. If this course is restricted to a specific major, which major. If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

1. **Yes** Are there any prerequisites?
   1. If yes, which ones?

**Prerequisite: ME 3513 Mechanical Vibrations;**

* 1. Why or why not?

**Prerequisite ensures proper understanding of the basics and the underlying math required in this course. Several of the concepts are associated with vibrations, which will help students relate to the topics discussed in acoustics and noise.**

1. **No** Is this course restricted to a specific major?
   1. If yes, which major? Enter text...
2. **Proposed course frequency [Modification requested? Yes/No]**

(e.g. Fall, Spring, Summer; if irregularly offered, please indicate, “irregular.”) *Not applicable to Graduate courses.*

**Irregular**

1. **Proposed course type [Modification requested? Yes/No]**

Will this course be lecture only, lab only, lecture and lab, activity (e.g., physical education), dissertation/thesis, capstone, independent study, internship/practicum, seminar, special topics, or studio? Please choose one.

**Lecture only**

1. **Proposed grade type [Modification requested? Yes/No]**

What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental, or other [please elaborate])

**Standard Letter**

1. **Yes** Is this course dual-listed (undergraduate/graduate)?
2. **No** Is this course cross-listed?

*(If it is, all course entries must be identical including course descriptions. Submit appropriate documentation for requested changes. It is important to check the course description of an existing course when adding a new cross-listed course.)*

**a.** – If yes, please list the prefix and course number of the cross-listed course.

**b.** – **Yes / No** Can the cross-listed course be used to satisfy the prerequisite or degree requirements this course satisfies?

1. **No** Is this course in support of a new program?

a. If yes, what program?

Enter text...

1. **No** Will this course be a one-to-one equivalent to a deleted course or previous version of this course (please check with the Registrar if unsure)?

a. If yes, which course?

Enter text...

**Course Details**

1. **Proposed outline** **[Modification requested? No]**

(The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

**Week 1: Introduction to Acoustics and Noise; basic concepts, terminology and definitions**

**Weeks 2-3: Wave propagation in one dimension, development and solution to the wave equation**

**Week 4: Time and frequency domain representations**

**Weeks 5-6: Reflection, transmission through plane interface; cavities, resonators, waveguides**

**Weeks 7-8: Noise, sources, signals, measurement and analysis of sound**

**Weeks 9-10: Signal processing, FFT, Octave band analysis**

**Week 11: dB levels, Noise criteria, regulations**

**Week 12: Analysis of simple resonant systems – Helmholtz resonator, pipes**

**Week 13: Noise control and applications**

**Week 14: Noise control methods, introduction to active noise control**

**Week 15: Noise control issues, standards**

1. **Proposed special features** **[Modification requested? No]**

**None**

1. **Department staffing and classroom/lab resources**

Class can be offered as part of the existing faculty teaching load; sufficient classroom space is available.

1. Will this require additional faculty, supplies, etc.?

**No**

1. **No** Does this course require course fees?

*If yes: please attach the New Program Tuition and Fees form, which is available from the UCC website.*

**Justification**

**Modification Justification (Course Modifications Only)**

1. Justification for Modification(s)

Enter text...

**New Course Justification (New Courses Only)**

1. Justification for course. Must include:
2. Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

**The course provides a basic introduction to acoustics, noise, and noise control which is useful for a practicing mechanical engineer, especially working in a manufacturing-type environment. The course will emphasize the role of acoustics, noise, and noise control in engineering applications. This is critical in practice due to OSHA regulations regarding environmental noise levels, including noise control measures. This course also helps students understand and appreciate the applications in design, HVAC, process monitoring, and control, which are all courses that mechanical engineering students take towards their degree.**

1. How does the course fit with the mission of the department? If course is mandated by an accrediting or certifying agency, include the directive.

**The course addresses fundamental acoustics and noise topics that would normally be considered as a requirement for mechanical engineering graduates. Down the road, it is envisaged that lab exercises within this course will be created to provide hands-on experience in acoustics-related design and noise measurement and analysis. This course will be a critical part of that effort.**

1. Student population served.

**Master of Science in Engineering students**

1. Rationale for the level of the course (lower, upper, or graduate).

**Course topics are sufficiently advanced to be a graduate-level course. The course is offered as a Mechanical Engineering Elective and MSEng graduate, to begin with, and will appropriately support other 5000 and upper-level application-oriented courses.**

**Assessment**

**Assessment Plan Modifications (Course Modifications Only)**

1. **Yes / No** Do the proposed modifications result in a change to the assessment plan?

*If yes, please complete the Assessment section of the proposal*

**Relationship with Current Program-Level Assessment Process (Course modifications skip this section unless the answer to #18 is “Yes”)**

1. What is/are the intended program-level learning outcome/s for students enrolled in this course? Where will this course fit into an already existing program assessment process?

An advanced, cross‐disciplinary understanding of engineering sciences, and an ability to relate physical concepts from multiple engineering disciplines;

This program-level student learning outcome is assessed during the thesis defense.

1. Considering the indicated program-level learning outcome/s (from question #19), please fill out the following table to show how and where this course fits into the program’s continuous improvement assessment process.

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| **Program-Level Outcome 3 (from question #19)** | Knowledge of advanced cross-disciplinary engineering sciences, and an ability to relate physical concepts from multiple engineering disciplines. |
| Assessment Measure | Direct Learning Activity: Students will endure an oral thesis examination which includes topics relating research to the broader impacts of engineering, technology, and society. ENGR 690 V Thesis  Direct Assessment: Student performance will be assessed by the thesis examination committee using a rubric.  Indirect Assessment Tool: Graduate survey |

*For further assistance, please see the ‘Expanded Instructions’ document available on the UCC - Forms website for guidance, or contact the Office of Assessment at 870-972-2989.*

*(Repeat if this new course will support additional program-level outcomes)*

**Course-Level Outcomes**

1. What are the course-level outcomes for students enrolled in this course and the associated assessment measures?

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| **Outcome 1** | **Understanding and appreciation of the role of acoustics, noise and noise control in engineering applications.** |
| Which learning activities are responsible for this outcome? | **Lectures and classroom discussion** |
| Assessment Measure | Course Grades |

*(Repeat if needed for additional outcomes)*

**Bulletin Changes**

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| **Instructions** |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Please include a before (with changed areas highlighted) and after of all affected sections.**  **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.** |

**Bulletin in Page 366**

***Before***

**ME 5503. Fluid and Thermal Energy Systems** Analysis and design of components, systems, and processes using the fundamentals presented in Thermodynamics, Fluid Mechanics, and Heat Transfer. Prerequisites, C or better in ME 3533 and ME 4553.

**ME 5523. Introduction to Finite Element Analysis** Theory and application of energy concepts and structural mechanics required for the development of finite element methods are presented. Applications to beams, trusses, torsion, etc. are presented. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4523.

***After***

**ME 5503. Fluid and Thermal Energy Systems** Analysis and design of components, systems, and processes using the fundamentals presented in Thermodynamics, Fluid Mechanics, and Heat Transfer. Prerequisites, C or better in ME 3533 and ME 4553.

**ME 5513. Fundamentals of Acoustics and Noise** Fundamentals of acoustics, terminology, wave propagation, measurement and analysis of sound, reflection and transmission through plane interface and waveguides. Quantifying and assessment of noise, sound levels, sources, sound absorption and transmission, Noise control methods and standards. Prerequisite: ME 3513. Dual Listed as ME 4513.

**ME 5523. Introduction to Finite Element Analysis** Theory and application of energy concepts and structural mechanics required for the development of finite element methods are presented. Applications to beams, trusses, torsion, etc. are presented. Prerequisites, C or better in ENGR 2413. Dual listed as ME 4523.