College of Mathematics, Natural Sciences, and Technology
Curriculum Change Approval Form

COURSE REVISION

Department: Physics & Pre-Engineering

Submission Date: September 15, 2008

Signature ____________________________  _______________
Chairperson, Departmental Curriculum Committee      Date

Signature ____________________________  _______________
Departmental Chairperson      Date

Signature ____________________________  _______________
Chairperson, College Curriculum Committee      Date

Signature ____________________________  _______________
Dean of College      Date

Signature ____________________________      _______________
Chairperson, Faculty Senate      Date
CURRICULUM COURSE REVIEW FORMAT

THIS FORM IS USED WHEN ALTERING THE COLLEGE CURRICULUM BY ADDING OR COMBINING COURSES

Course # 26-141

1. Course Title/Number: Sound & Acoustics

2. Number of Credits: 3 + 1 (for lab) = 4

3. Curriculum Program Title: Undergraduate Physics (both majors and Non-majors)

4. Curriculum/Course is: -------- New ----X-----Revised

-------- Required Course --------Elective Course

5. List Prerequisites: None

6. List courses being replaced or changed: The Science of Hi Fi

7. List courses being deleted: None

8. Need statement: (give a brief statement explaining the need for the new course or for combining courses) Does this course adjustment alter the nature of the curriculum program or the degree to be awarded?

This course will provide basic understanding of sound waves and acoustics to entry level Physics and non-majors undergraduates. This course will give an insight of sound engineering which has wide applications in everyday life. The course will neither alter the nature of the curriculum program nor the degree to be awarded.

9. Catalogue description of the program:

The course will develop understanding of the basic sound waves and acoustics, their classification, and interaction with regard to different applications. The topics will include fundamentals of waves, sound production and detection, measurement of sound waves, interference, reflection and refraction, Doppler effect, sound tuning, and musical instruments, acoustics, and applications.

10. List Objectives of the course:
Entry-level Physics majors and Physics non-majors under the Physics and Pre-engineering program will learn about sound and acoustics, the analysis of musical tunes, fundamentals of advanced sound systems and their applications, and acoustic devices.

11. Course Outline:

Part A: In Class

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic(s)</th>
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<tbody>
<tr>
<td>1 &amp; 2</td>
<td>Simple harmonic motion and applications, waves and sound, wave definition, types of waves, how to produce sound, sound transmission &amp; detection, sound intensity, reflection and refraction, Doppler effect.</td>
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<tr>
<td>3 &amp; 4</td>
<td>Waves &amp; Interference: wave superposition, constructive and destructive interference, sound diffraction and dispersion, transverse and longitudinal standing waves, natural frequency and resonance beats.</td>
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<tr>
<td>5</td>
<td>EXAM I</td>
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<tr>
<td>6</td>
<td>Decibels, musical instruments (string, wind, percussion instruments)</td>
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<td>7</td>
<td>Analysis and synthesis of complex waves</td>
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<td>8</td>
<td>Human ear and voice</td>
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<td>9</td>
<td>Home applications: tape decks, digital recorders, home entertainment systems</td>
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<tr>
<td>10</td>
<td>Exam II</td>
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<tr>
<td>11</td>
<td>Acoustics: definition, types, applications</td>
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<tr>
<td>12</td>
<td>Phonons, surface acoustic wave (SAW) and SAW devices, piezoelectric effect</td>
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<tr>
<td>13</td>
<td>Ultra-sonography, seismology</td>
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<tr>
<td>14</td>
<td>Exam III</td>
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</table>

Part B: Laboratory Work:
There will be a series of laboratory experiments in series with the classes for better understanding of the subject. Some of the typical experiments would include:

1. Pendulum lab
2. Standing waves in a string
3. Vibration of tuning forks
4. Beats
5. Analysis of musical tunes

Reference Books

1. “Physics of Hi-Fi”, Orest G. Symto, Kendall Hunt Publ., Iowa 2002
12. Show how the proposed course fits into the curriculum or course sequence. Attach course descriptions and list course numbers.

This course is suggested as an elective course for B.S. students in Physics & Pre-Engineering program in the Physics Department.

13. Are there comparable courses in other departments, if so list all comparable courses here?

There is no comparable course in other department.

14. How will students be affected by this course change? Will this course improve student's professional competence, employability, and ability to pass professional examinations? Does this course increase the number of credit hours required for graduation? Does the course prerequisites increase the total number of semester hours in this curriculum program?

An understanding of sound waves and acoustics is essential for both Physics major and non-major students for a basic understanding of things used in everyday life, and in research. The course will neither increase the credit hour requirement for graduation nor the number of semester hours.

15. What effect will this new course have on college resources? Will this course require new or additional resources or staffing?

No additional resources or staff is needed for implementing this course.

16. How will it benefit the college?

This course will benefit the college as well as the university by better preparing the students in understanding the principles and working of everyday instruments and devices. It will offer the essential knowledge on various types of sound waves and acoustics that they use each day, and will encourage the students to pursue their studies in Physics and Pre-engineering. Applications of sound waves are widely prevalent in many research areas such as medicine, and engineering. Students from any disciplines will be able to take this course and greatly benefit as well.

17. How will the change affect the program?
The change will not affect the existing program. It will strengthen the curriculum by offering practical knowledge on the sound and acoustics.