Proposal for a Graduate Certificate in Noise Control Engineering

Submitted Jointly
by the
School of Mechanical Engineering and Continuing Engineering Education
West Lafayette Campus
Purdue University

A Graduate Certificate Program in
Noise Control Engineering

Awarded by

The Graduate School
And
School of Mechanical Engineering
In cooperation with
Continuing Engineering Education

Initiation Date: January 2004 (Requested)

Approved By:

E. Dan Hinkleman
William E. & Florence E. Perry Head
School of Mechanical Engineering

Philip H. Swain
Interim Director
Continuing Engineering Education

Linda Katehi
John A. Edwardson Dean of Engineering
Schools of Engineering
Purdue University

A Graduate Certificate Program in

Noise Control Engineering

Awarded by
The Graduate School
and
School of Mechanical Engineering
in association with
Continuing Engineering Education

This Noise Control Engineering Graduate Certificate program is designed to meet the needs of the practitioner in industry. Starting from a basic treatment of the underlying fundamentals and improved analytical skills in required courses in engineering acoustics and mechanical vibrations, this Graduate Certificate offers the student a choice from an array of courses, including signal processing, advanced acoustics, noise control, acoustic materials and aeroacoustics. In this way, the program of study can be tailored to meet individual needs in different application areas. It can be completed over a short period of time, and offers significant flexibility in course offerings. It has grown out of requests from industry, and reflects responsiveness to many of today’s noise control engineering needs. Specifically, the engineer in industry would:

- Enhance his/her understanding of Noise Control Engineering processes and technologies and their applications in industry;
- Strengthen his/her analytical skills and the ability to handle complex interdisciplinary problems;
- Be equipped with tools that will improve his/her ability to solve realistic problems, with a comprehensive approach.

Outline of Information

Purpose of the Program
Target Audience
Relation to Existing Certificate Programs
Frequently Asked Questions
Completion Requirements
Admission Requirements
Course Curriculum
Administration of the Graduate Certificate
Notice of Interest, Application for Admission
Purpose of the Program

This Certificate program, sponsored by the School of Mechanical Engineering in cooperation with the Continuing Engineering Education at Purdue University is designed to help the engineer in industry and research and development organizations become knowledgeable about the area of noise control as applied to the solution of industrial problems. Focus is on industrial problems related to a range of industries including transportation, propulsion systems, manufacturing, and any engineered products. The awarded Graduate Certificate will serve as evidence that the student has achieved a significant level of expertise in Noise Control Engineering. When fully implemented, it is expected that there will be approximately fifteen to twenty students enrolled in the graduate certificate program, with nearly half of them enrolling concurrently or subsequently for a graduate degree at Purdue.

Target Audience

This Graduate Certificate program meets the needs of

- mid-career and late-career engineers
- engineers new to the area of Noise Control Engineering
- engineering managers who need a background in Noise Control Engineering and its implementation in emerging technologies

Since the graduate certificate is intended to upgrade analytical and application skills of engineers in industry, it is not available to degree-seeking students enrolled in the Mechanical Engineering Graduate Program at Purdue.

Relation to Existing Certificate Programs

Currently, there is no certificate program in “Noise Control Engineering” available through Purdue University. One certificate program in “Heat Transfer” is presently being offered through the School of Mechanical Engineering. It is anticipated that other Graduate Certificates focused on the needs of engineers in various industries will be developed in the future by other disciplines in engineering and sciences. The core courses of the proposed graduate certificate on Noise Control Engineering include Fundamentals of Noise Control, Engineering Acoustics, Mechanical Vibrations, and Fourier Methods in Digital Signal Processing. These may also serve as foundation to graduate certificates in other interdisciplinary fields such as system dynamics, measurement systems and controls, bioacoustics, and materials.

Frequently asked Questions about the Graduate Certificate

- How to apply for the Graduate Certificate?

The student must complete the Purdue University Graduate School application form for studies at West Lafayette (Main Campus). In the enrollment objectives, the student must state “Certificate Program”. In the item on specification of subject area, the student needs to indicate “Graduate Certificate in Noise Control Engineering”. The Mechanical Engineering Graduate Office will process the application for admission into the Certificate Program.
“worksheet” (like the one attached) will be created and made available (mailed) to the student. The student can use the worksheet to keep track of the courses he/she takes and the grades earned in each.

The student can also obtain information about the Graduate Certificate by completing the attached “Notice of Interest”. When CEE receives the notice of interest, the student will be sent up-to-date descriptions of the requirements, contact information for the ME graduate administrator who can answer questions about requirements or content, and the CEE Graduate Advanced Planning Schedule for Off-Campus Students. CEE will send a copy of the student’s notice to the ME graduate administrator while indicating the need to apply to the Purdue University Graduate School.

- How long is the student allowed to take to complete the Certificate?

All courses must be taken within a four-year time span. Students set their own pace for completion. However, it should be noted that the courses included in the Graduate Certificate are not available every semester (either through live television broadcast or via other distance education media including videotapes and videostreaming). Thus, the student will need to refer to the CEE Graduate Advanced Planning Schedule for Off-Campus Students to determine when the courses will be offered. The first and last classes the student takes for the Graduate Certificate define the four-year time frame.

- Do courses taken at Purdue University before the student enrolls in the Graduate Certificate program apply?

Yes, if they are applicable to the Graduate Certificate at the time the student registers for the program, and if they fall within the four-year time limit.

- If a student already has a Master’s or PhD from another school or in another field from Purdue University, can he/she still earn a Purdue Graduate Certificate in Noise Control Engineering?

Yes.

- How can the student receive credit for a course taken elsewhere that he/she wishes to transfer to the Graduate Certificate program?

To obtain a letter of approval to transfer credit for one course taken elsewhere, the student needs to send the ME Graduate Office a request together with the catalog description, course syllabus, and an official transcript. The student must have earned a grade of B or better in the course for the course to be transferable. The student must clearly indicate towards which of the Graduate Certificate requirements (required or elective, as specified below) the course is to be applied. Only one three-credit course can be transferred.

- How does the student receive the Certificate?
In the semester the student is registered for the last class applicable towards the certificate, the student will send the ME Graduate Administrator the completed worksheet. At the end of the applicable semester, and within one week of the official availability of the course grade, the Graduate Chair of Mechanical Engineering will check for the completion of the certificate requirements. If the student has successfully completed the program requirements, the Graduate Chair will notify the Graduate School, who in turn will notify the Office of the Registrar. The Office of the Registrar will generate the Certificate for the student and forward it to the permanent address of the student.

- How will the Certificate be recorded?

“GRADUATE CERTIFICATE
FIELD OF STUDY: Mechanical Engineering
SPECIALIZATION: Noise Control Engineering”

- Can the student earn both, a Certificate and an MSE, MS, or MSME degree from Purdue?

Yes. Courses can be counted both for the Certificate and for a Master’s degree. However, students already enrolled in the Master’s degree program in Mechanical Engineering from Purdue are not eligible to apply for the certificate. Note that, to be a graduate student in a degree-seeking Master’s program, the student must complete a separate application form and be admitted to the MS, MSE or MSME program by the Purdue University Graduate School.

- Other questions?

Call the Mechanical Engineering Graduate Administrator at (765) 494-5729, or the Graduate Coordinator of CEE at (765) 494-7015.

Completion Requirements

- 12 credits in noise control and related courses (i.e., other related aspects of mechanical engineering). Up to three semester credits can be transferred from another university (effectively, one of four courses); the remainder must be earned at Purdue.

- An average grade of B or higher overall is required. If the student receives a lower grade in a course, he/she may repeat it once, or, for elective courses only, substitute another approved elective. This repetition or replacement will be allowed only for a maximum of two courses.

- Note: 12 credit hours earned in non-degree status (while enrolled in the Graduate Certificate) at Purdue University may be applied towards a graduate degree.

Admission Requirements

- The applicant must have a Bachelor’s degree in an appropriate area (Engineering, Science, Mathematics, Technology) with a Graduation Index (or GPA) of 3.0 or higher from an accredited institution in USA, or a duly recognized foreign institution. The student must also arrange for at least one ‘letter of reference’ to be sent directly to the Graduate Office of the
School of Mechanical Engineering. For International students whose native language is not English, a minimum TOEFL score of 550 is also required. Alternate criteria may be applied to applicants who have been in the US for at least two years.

- Note: Acceptance into the Certificate program does NOT assure admission to the Graduate School of Purdue University to pursue an advanced degree.

**Course Curriculum**

All courses carry one or three semester credit hours (as indicated in the list below) and are taught by the graduate faculty of Purdue University.

**Required**
- ME 513: Engineering Acoustics (3 cr.)*
- ME 563: Mechanical Vibrations (3 cr.)*

And six credits from the following electives:

**Specialty Electives**
- ME 579: Fourier Methods in Digital Signal Processing (3 cr.)*
- ME 595N: Fundamentals of Noise Control (1 cr.)*+
- ME 640: Structural Acoustics (3 cr.)
- ME 613: Advanced Engineering Acoustics (3 cr.)*
- ME 615: Aeroacoustics (3 cr.)*
- ME 564: Vibrations of Discrete Systems (3 cr.)
- ME 580: Nonlinear Engineering Systems (3 cr.)
- ME 597A: Experimental Structural Dynamics (3 cr.)
- ME 664: Vibrations of Continuous Systems (3 cr.)
- ME 681: Finite and Boundary Element Methods (3 cr.)

**Complementary Electives**
- ME 575: Theory and Design of Control Systems (3 cr.)*
- ME 509: Intermediate Fluid Mechanics (3 cr.)*
- ME 500: Thermodynamics (3 cr.)*
- MA 520: Boundary Value Problems of Differential Equations (3 cr.)*
- MA 511: Linear Algebra with Applications (3 cr.)*
- MA 525: Introduction to Complex Analysis (3 cr.)*

---

* Currently available on TV
+ Two additional one-credit courses are being planned during the next few years.
Administration of the Graduate Certificate

The Graduate Chair of the School of Mechanical Engineering will be responsible for administering the graduate certificate program for the School. When the application submitted by the student via the Purdue University Graduate School is received, a folder will be created for the student. Within one week of being complete (with the BS transcript and one reference letter), the folder will be reviewed. The recommendation for admission will be communicated to the Graduate School and the applicant will also be advised of the action. Along with this advice, the student will be sent the “worksheet” (attached with this document). The progress of the student through the graduate certificate will be tracked using the “worksheet”, one copy of which will be made available to the student, and one copy placed in the student’s folder.

In the semester the student is registered for the last class applicable towards the certificate, the student will send the ME Graduate Administrator the completed worksheet. The address is:

ME Graduate Administrator  
School of Mechanical Engineering  
Mechanical Engineering Building  
585 Purdue Mall, Room ME 112  
Purdue University  
West Lafayette, IN 47907-2088

At the end of the applicable semester, and within one week of the official availability of the course grade, the Graduate Chair of Mechanical Engineering will check for the completion of the certificate requirements. If the student has successfully completed the program requirements, the Graduate Chair will notify the Graduate School, who in turn will notify the Office of the Registrar. The Office of the Registrar will generate the Certificate for the student and forward it to the permanent address of the student.
Notice of Interest

Graduate Certificate Program in Noise Control Engineering

I am interested in receiving the information packet for the Graduate Certificate Program in Noise Control Engineering.

Name
Address
City
State
Zip
Phone (Home)
Phone (Work)
Email
Fax

Undergraduate Degree (title, date awarded, institution, and GPA)

Signature
Date

Note: Certificate requirements may change over time. Requirements applicable are those in-effect in the semester in which the student is admitted into the certificate program through application to Purdue University Graduate School. Also, this is not an application. The application is available on the website of Purdue University Graduate School. The student needs to fill the Graduate School application form for admission into the graduate certificate.

Complete and return this form to:

Continuing Engineering Education
Purdue University
Potter Engineering Center Room 364
500 Central Drive
West Lafayette, IN 47907-2022

Office Use Only

Reply Date:

ME Date:
# RECORD WORKSHEET
## GRADUATE CERTIFICATE IN NOISE CONTROL ENGINEERING

Name (as it should appear on certificate): _________________________________________

Address: ___________________________________________________________________

City, State, Zip: ______________________________________________________________

Telephone: (Home)_________________________ (Work)__________________________

Student ID Number: __________________________________________________________

Completed Courses for the certificate program:

<table>
<thead>
<tr>
<th><strong>Required</strong></th>
<th>Date Completed</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 513: Engineering Acoustics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 563: Mechanical Vibrations</td>
<td>_____________</td>
<td>_______</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Electives</strong></th>
<th>Date Completed</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 579: Fourier Methods in DSP</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 564: Vibrations of Discrete Systems</td>
<td>____________</td>
<td>_______</td>
</tr>
<tr>
<td>ME 597A: Experimental Structural Dynamics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 595N: Fundamentals of Noise Control</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 580: Nonlinear Engineering Systems</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 613: Advanced Engineering Acoustics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 615: Aeroacoustics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 664: Vibrations of Continuous Systems</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 681: Finite and Boundary Element Methods</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 640: Structural Acoustics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 575: Theory and Design of Control Systems</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 509: Intermediate Fluid Mechanics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 500: Thermodynamics</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>MA 520: Boundary Value Problems of Diff. Eqns.</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 511: Linear Algebra with Applications</td>
<td>___________</td>
<td>______</td>
</tr>
<tr>
<td>ME 525: Introduction to Complex Analysis</td>
<td>___________</td>
<td>______</td>
</tr>
</tbody>
</table>