

University of Pennsylvania
Department of Electrical and Systems Engineering

ESE SENIOR DESIGN PROJECT - ADVISOR SUBMISSION FORM

1. Project Title:

Monitoring and Analysis of Noise Levels at HUP

2. Proposer's Name: K. Laker, J. Van der Spiegel, S. Kassam (ESE) **E-mail:** laker@seas
S. Kagan (School of Nursing)

Are you willing and able to serve as advisor for this project? Yes; No

3. Brief Project Description:

Noise in hospitals has been studied since the 1960's and, though sources of noise in hospitals have changed somewhat as new technologies have driven introduction of new tools and equipment, noise remains a significant problem for patients, family members, and health care workers in many areas of the hospital environment.

This project will study noise on a general care ward and the operating room at the Hospital of the University of Pennsylvania. This project will begin with noise monitoring for decibel level, proceed to a second phase of analysis of noise sources, and then to a third phase to measure reaction to noise and influence on work flow, patient and family experience, and healthcare outcomes. Students are welcome to participate in any or all phases of the project.

4. Project Design Objectives:

The initial phase of the project will evaluate different technical options for a simple noise monitoring scheme, and design a low-cost system which can provide basic noise level estimates as a function of time in a few selected locations on a ward or operating room. The system will need a computer interface for data storage/retrieval and potentially a wireless scheme for data collection. The system will then be implemented at HUP.

Data from the initial phase will be analyzed, and in the second phase the monitoring system will be expanded to allow characterization of the type and sources of noise, rather than only a sound level (dB) indication.

5. Project Prerequisites:

What specific knowledge (e.g. courses or topics) and skills (e.g. programming languages or software packages) will this project require? Please rank order the knowledge and skills you have identified, with the most important at the top of the list.

Knowledge of areas and material covered in courses listed below should be part of the combined skill set of the project team:

CSE 110, Matlab, ESE 215/216, ESE 350, ESE 210, ESE 325, ESE 319, some exposure to DSP concepts.