

# MAS.836 Spring 2008

## Sensor Systems for Interactive Environments

### Teaching Assistants :

Jason LaPenta ([the5@mit.edu](mailto:the5@mit.edu)) Office Hours Tuesday 2:00-3:30pm (E15-352)

Mark Feldmeier ([carboxyl@mit.edu](mailto:carboxyl@mit.edu)) Office Hours Wednesday 5:00-7:00pm (E15-351)

Website : <http://www.media.mit.edu/resenv/classes/MAS836/>

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This class presents a broad introduction to a host of sensor technologies, illustrated by applications drawn from human-computer interfaces and ubiquitous computing. After extensively reviewing electronics for sensor signal conditioning, the lectures cover the principles and operation of a variety of sensor architectures and modalities, including pressure, strain, displacement, proximity, thermal, electric and magnetic field, optical, acoustic, RF, inertial, and bioelectric. Simple sensor processing algorithms and wired and wireless network standards are also discussed. The goal of this class is to provide students a broad introduction to state-of-the-art techniques, exposure to current research, and practical experience that will assist in developing and fielding such systems in their own work. Students are required to complete written assignments and a final project as well as participate in hands-on laboratory sessions.

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### Main Texts

- [1] J. Fraden, *Handbook of Modern Sensors: Physics, Designs, and Applications*. New York: Springer, 2003.
  - [2] P. Horowitz and W. Hill, *The Art of Electronics*. New York: Cambridge University Press, 1989.
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### Grading:

Problem Sets: 30%

Final Project: 30%

Lab Performance: 30%

Attendance, Participation: 10%

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## Tentative Class Schedule: Thursdays, 1 - 4 PM in E15-235

<b>February 7</b>	Introduction, Electronics
<b>February 14</b>	Electronics Continued
<b>February 21</b>	Electronics Concluded
<b>February 28</b>	Pressure, Force
<b>March 6</b>	Pressure, strain, and Piezoelectrics
<b>March 13</b>	Electric Field and Capacitive Sensing
<b>March 20</b>	Capacitive Applications and Magnetic Sensing
<b>March 27</b>	No Class (Spring Break)
<b>April 3</b>	Optical Sensing
<b>April 10</b>	Inertial Sensing
<b>April 17</b>	Digital Sensor Processing and Modules
<b>April 24</b>	Acoustic and Thermal Sensing
<b>May 1</b>	RF and Acoustic Coherent Sensing
<b>May 8</b>	No Class (TTT)
<b>May 15</b>	Bioelectric Sensing and related topics
<b>May 22</b>	Final Presentations