ECE 620/BME 630
An Introduction to Biomedical Imaging Systems

ME 2053:  10:30-11:20 MWF

Instructor:  Dr. Thomas M. Talavage (tmt@purdue.edu)
            MSEE 362 / 49-45475

Office Hours:  MWF 9:30-10:20

Class Homepage:  http://fmri.ecn.purdue.edu/ImagSys

Course Description:  The purpose of this course is to present an overview of biomedical imaging systems and image analysis. The course will examine various imaging modalities including xray, ultrasound, nuclear, and MRI. How these images are formed and what types of information they provide will be presented. Image analysis techniques will also be emphasized. Specific analysis techniques will include the analysis of ultrasound, mammography, and MRI functional imagery.

Required Text:  None


Assignments:  Several homework assignments will be made during the course of the semester.

Projects:    Several individual projects (research reports, programming projects) will be assigned during the course of the semester. Topics will relate to imaging physics, data acquisition, image formation and applications. Projects will be submitted via Dropbox.

Grading:    Mid-Term Exam 25%
            Final Exam 30%
            Homeworks 20%
            Projects 25%
            Total 100%
Spring 2016 ECE 620/BME 630 Schedule (Tentative)

<table>
<thead>
<tr>
<th>Week(s)</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1</td>
<td>Overview/Math Foundations/Energy-Matter Interactions</td>
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<tr>
<td>2</td>
<td>Physiological Limitations of Energy Exposure</td>
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<tr>
<td>3-5</td>
<td>Projection Tomographic Concepts (X-ray/CT)</td>
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<tr>
<td>6-7</td>
<td>Emission Tomographic Concepts (PET/SPECT); <strong>MID-TERM</strong></td>
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<td>8-10</td>
<td>Transmission/Reflection Tomography (US/Optical)</td>
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<tr>
<td>11-15</td>
<td>Resonance Tomographic Concepts (MRS/MRI)</td>
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<tr>
<td>16</td>
<td><strong>FINAL EXAM</strong></td>
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Course Policies:

- For those on-campus, please come to lectures ON TIME to minimize disruptions.
- I encourage you to use e-mail to communicate with me. You'll probably find it easier to get short questions answered by e-mail rather than during office hours.
- **LATE HOMEWORK WILL NOT BE ACCEPTED.** All assignments are to be turned in at the beginning of the indicated class period.

**THERE WILL BE NO EXCUSED ABSENCES OR ASSIGNMENTS.**

- There will be NO *WRITTEN* make-up exams. If you cannot avoid missing an exam (and have supporting documentation), contact me **BEFORE** the exam and an *oral* make-up exam will be arranged, to take place at the whiteboard in my office or via Skype.
- Regrade requests must be submitted within one week of the return of the assignment. A regrade request consists of the assignment in question and a written explanation of why you believe more points should have been awarded. Be aware that, under a regrade request, the ENTIRE assignment will be regraded.
- In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. In such an event, information will be provided through the course website.
- I always welcome constructive comments on how the course can be improved. Please let me know of your suggestions.
Academic Honesty Policies:

- All coursework must be done individually. I encourage you to discuss and collaborate on ideas for doing the homework, but what you hand in should be your own work. Do not read another student’s solution or allow yours to be read.

- All cases of cheating on quizzes, homework or project assignments (e.g., plagiarism, duplicate assignments) will result in a corresponding semester grade of 0 for all parties concerned. If you are uncertain as to what constitutes plagiarism or cheating, please consult Prof. Talavage before you undertake to complete an assignment.

- All cases of cheating on an exam will result in a grade of 0 for either that exam or the semester, at the discretion of the instructor. When the end of an exam is announced, students who fail to cease working and to hand in their exams immediately will be considered to be cheating, and their exams will be confiscated and WILL NOT be graded.

- All cases of cheating will be reported to the Assistant Head of the Weldon School of Biomedical Engineering and to the Office of the Dean of Students. If those involved in the cheating incident are found by either of these parties to be repeat offenders, disciplinary action may be taken by the University.

Ethics in ECE 620/BME 630

Along with the rest of the ECE faculty, I expect every member of the Purdue community to practice honorable and ethical behavior both inside and outside the classroom. Any actions that might unfairly improve a student's score on homework, examinations or projects will be considered cheating and will not be tolerated.

From the Purdue Dean of Students “Student Code of Conduct” web page:

The following actions constitute misconduct for which students may be subject to administrative action or disciplinary penalties.

_Dishonesty in connection with any University activity. Cheating, plagiarism, or knowingly furnishing false information to the University are examples of dishonesty. The commitment of the acts of cheating, lying, stealing, and deceit in any of their diverse forms (such as the use of ghost-written papers, the use of substitutes for taking examinations, the use of illegal cribs, plagiarism, and copying during examinations) is dishonest and must not be tolerated. Moreover, knowingly to aid and abet, directly or indirectly, other parties in committing dishonest acts is in itself dishonest._

Once again, I encourage you to speak with me prior to engaging in any activity that may be construed as cheating.