SYLLABUS
CE580 Theory and Application of Structural Reliability
Spring 2006

Instructor:
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Course: B2 Engr., 10:00-10:50 a.m.

Grading:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Paper Reviews/Presentations</td>
<td>25%</td>
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<tr>
<td>Homework</td>
<td>25%</td>
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<tr>
<td>Software Toolbox (MATLAB)</td>
<td>25%</td>
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<tr>
<td>Project</td>
<td>25%</td>
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<td>Total</td>
<td>100%</td>
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Homework and Toolbox assignments will be posted on my web page.

Project presentations will be given during the final exam period.

Course Objectives: To present the theory of structural reliability as it relates to analysis, design, construction, and maintenance of structural and mechanical systems; application to existing and emerging code calibration procedures; and introduce advanced topics. Upon successful completion of this course the student should be able to read and understand most of the current literature in the topic of structural reliability thus enabling them to pursue research work at the graduate level in this area, if desired.

Subjects to be covered:

- **Weeks 1&2** Introduction to MATLAB
- Introduction to Reliability
- Basic definitions and rules of probability
- Random variables

- **Weeks 3&4** Probability functions
- Expectation and statistical moments
- Moment generating functions

- **Weeks 5&6** Probability of failure
- Statistics of the extremes
- Gumbel and Weibull distribution

- **Weeks 7&8** First order second moment methods
- Linear performance functions
- Non-linear performance functions

- **Weeks 9-11** LRFD code calibration
- Applications to bridges
- Applications to woodframe structures

- **Weeks 12-14** Application to structural dynamics problems
- Performance-Based Design for wind and seismic loads

- **Week 15** Presentation of Projects