Course Syllabus

Instructors: Morgan Hurley & Eric Rosenbaum

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Course Objectives:

Upon completion of this course, students will be able to:

- Perform and present a comprehensive performance-based analysis of a building in accordance with prevailing professional standards
- Identify and quantify design fire scenarios
- Develop fire protection design strategies for the protection of people, property, mission and the environment from fire
- Apply fire protection engineering tools to evaluate whether design strategies achieve project goals.

Learning Outcomes:

Students who are successful in this course will be able to:

- Understand and apply the process of performance-based design
- Understand hazard-based and risk-based design approaches
- Develop design fire scenarios
- Design fire protection systems, such as detection, suppression, smoke control and fire resistance, on a performance basis
- Consider human performance in design analysis

Overview:

This course will demonstrate how fire science can be used to solve fire protection problems in the built environment. The course will provide an understanding of the performance-based design process, deterministic and risk-based analysis techniques, development of design fire scenarios, trial design development and analysis, and building lifecycle management.

To get the most out of this course, students should have developed a basic understanding of fire dynamics and the types of systems that are used to protect against fire in buildings and other structures.

Required Texts:

1. Hurley, M. & Rosenbaum, E. Performance-Based Fire Safety Design

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4. SFPE Engineering Guide to Performance-Based Fire Protection

Modules

1. Introduction
2. Hazard and Risk
3. Design Fire Scenarios
4. Design Fires
5. Fire Dynamics and Hazard Calculations
6. Evaluation (Human Behavior)
7. Evaluation (Detection System and Smoke Control System Design)
8. Evaluation (Structural Fire Resistance)
9. Uncertainty and Fire Testing
10. Performance-Based Design Documentation and Management

Exercises and assignments are included within the modules. The exercises are intended to help you to understand applications of the material and to foster discussions among you and your fellow students. Some exercises encourage you to share your results with others and to discuss the implications of these exercises.

Discussions

You are encouraged to participate in discussions to get the most out of the class. There is not a single approach to “performance-based design,” so you will benefit from the perspectives of your fellow students.
Discussions can occur in the following areas:

- Announcements: Do not post in this area, but check it regularly. This is where announcements will be posted from those of us delivering and supporting the course.
- Conferences (online office hours): Discussions will be conducted via the Conferences tool Tuesdays from 8:00-9:00 p.m. (US Eastern Time).

Assignments

Assignments are problems that require solutions. We encourage you to submit answers to these assignments via ELMS. Group assignments should be submitted on Canvas by one member of your group. Please label the submission with some descriptive text such as “Group x submission.”

It will be to your benefit to show your work. Giving us only the answer is the equivalent of putting all your eggs in one basket. If that answer is wrong, there will be no partial credit. You can show your work by including calculations or spreadsheets.

You are expected to contribute to each group assignment. If you do not participate in an assignment, you will not learn from it. **We will review the posting in the group discussion areas to ensure that each group member contributes in a substantive manner to each assignment. Please note that postings like “looks good” are not considered substantive.**
If you do not substantively contribute to a group submission, you will not receive any credit for it.

Also, we expect each submission to pass the “reasonableness” test. A good rule of thumb in performance-based design is that if something does not look right, it probably isn’t. A predicted temperature that it hotter than the sun or a predicted evacuation time that is a fraction of a second or years long is clearly not realistic. **Submissions that are clearly not realistic will receive a grade of zero unless it is noted that something does not seem right.**

A schedule of due dates is provided within each module and on the Course Schedule. This is provided so that you “keep pace” and do not try to complete the entire course in the last week of the 12-week term.

We appreciate that many of you have busy work schedules and may have difficulty fulfilling all of the course requirements by the noted dates. If you need additional time to complete an assignment, contact us before the due date and we will work out an agreeable solution. Keep in mind that we are willing to make an occasional adjustment, but in fairness to others, we cannot do so every week.

Assignments will vary in nature. There will be those that have numerical answers and those that require a verbal discourse. There will be assignments related to additional readings and to use of computer programs. Typically, assignments are due on the Sunday of the week following release of the Module.

**Exams - Midterm/Final**

Following Module 5, we will post the midterm assignment for you to review and complete. This will give time for you to ponder a solution, ask questions to clarify any issues and develop a solution. The assignment is to be completed solely by you, without correspondence with your colleagues. Similarly, the final exam is to be completed solely by you, without correspondence with classmates or colleagues unless otherwise instructed.

**Grading**

Points credited toward your final grade will be awarded based on performance as indicated in the table below. Grading for assignments and projects will be based on points awarded for each module or project.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>60%</td>
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<tr>
<td>Midterm project</td>
<td>20%</td>
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<tr>
<td>Final project</td>
<td>20%</td>
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**Student Feedback and Course Evaluations**

We would appreciate any comments about the course, the delivery mechanism, administration or any other issue. Please feel free to send along comments during the term (especially if it is something that could be altered promptly to make an immediate improvement). Otherwise, you are welcome to wait until the end of the term. For any correspondence to us, whether
involving a question about the course material or a comment about the course delivery, we will seek to provide a response within 36 hours.

Faculty for this course are working professionals. Therefore, we encourage students not to wait until the last minute to begin work on assignments. Assignments are generally due on Sundays, and we may not check our email on Saturdays and Sundays. Therefore, it is best not to wait until the last 48 hours before an assignment is due to ask questions.

In addition to individual comments sent directly to us, a final evaluation will be available for you to complete. These surveys are completely confidential. You will receive a notice in the course when these become available.

**Course Schedule**

<table>
<thead>
<tr>
<th>Week</th>
<th>Module</th>
<th>Assignments due on</th>
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<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>December 11</td>
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<tr>
<td>2</td>
<td>2</td>
<td>December 18</td>
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<td>3</td>
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<td>January 1</td>
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<tr>
<td>5</td>
<td>5</td>
<td>January 15</td>
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<td>6</td>
<td>Mid-term project due</td>
<td>January 22</td>
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<td>7</td>
<td>6</td>
<td>January 29</td>
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<td>8</td>
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<td>February 5</td>
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<td>11</td>
<td>10</td>
<td>February 24</td>
</tr>
<tr>
<td>12</td>
<td>Final project due</td>
<td>February 24</td>
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**Note Regarding Travel:**

A number of you are working professionals and your jobs require that you travel. If you have travel that you know will make it impossible to access this course for an extended period, we ask that you make us aware of it as soon as possible in order to make arrangements and so that you are not penalized. If you have last-minute travel that takes you somewhere without Internet access, please notify us and we will work out an arrangement.

**Notes about submitting assignments:**

- Assignments may be submitted multiple times before the due date. You may wish to do this if you would like to make a change after you've submitted it. Only the final submittal will be graded.
• All assignments are due on the dates listed above.
• Late submissions will not be accepted unless prior arrangements have been made.

Academic Integrity:

We abide by and enforce the University’s *Code of Academic Integrity*. The Code can be accessed from [http://www.president.umd.edu/policies/docs/III-100A.pdf](http://www.president.umd.edu/policies/docs/III-100A.pdf). If you are not familiar with the *Code of Academic Integrity*, please read it.