# ENFP 101: HOT TOPICS IN FIRE PROTECTION ENGINEERING

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**Location:** JM Patterson 1109
**Time:** Mon. 12 PM – 12:50 PM

**Overview:** This course will introduce students to the impact of fire on people, property and the environment and methods to mitigate the threat of fire. Student teams will apply the principles of fire behavior and fire safety systems covered in the first half of the course to design, build and test a fire safe, small-scale apartment. A final experiment will be conducted to provide an assessment of the complete designs of each team.

**Grading:** Grades will be based on the following papers and attendance.

| | |
|---|---|
| Assignments | 30% |
| Presentation | 15% |
| Final Paper | 40% |
| Class Participation | 15% |
| Total | 100% |

**Attendance:** Attendance is mandatory. Any unexcused absence will result in a deduction to your grade.

**Assignments and Final Paper:** Assignments reinforce topics covered during seven class meetings (see "*" in list of topics). Assignments will be due at the beginning of the next class meeting.

A final paper will summarize the experiment conducted on the last class. The paper should describe the design selected for the apartment (with a brief discussion supporting why the various design aspects were selected), the observations/measurements from the experiment and conclusions. Conclusions should include a comment on whether the design was successful and what would be changed in a $2^{nd}$-generation version of the residence. The final paper is due by noon on Dec 18.

Late submissions will be penalized 10% per day. Extensions to paper deadlines may be granted in extraordinary circumstances if you contact me *before* the due date. All papers will be graded for clarity, creativity, depth, and style.

**ACADEMIC INTEGRITY:** The University of Maryland expects students to be responsible for their academic work. Every student is expected to adhere to the University's policies, especially those involving academic integrity. The University's policies are posted here: http://www.ugst.umd.edu/courserelatedpolicies.html. In all work in this class, students are expected to adhere to the Honor Pledge, "I pledge on my honor that I have not given or received any unauthorized assistance on this examination or assignment."

**Any student with special needs or concerns should contact me as soon as such concerns become evident.**

**Schedule of Topics:**

| Date | Topic |
|---|---|
| Aug 28 | Introduction* |
| Sep 11 | Fire Behavior and Materials* |
| Sep 18 | Fire Detection* |
| Sep 25 | Life Safety * |
| Oct 2 | Smoke Control/Ventilation* |
| Oct 9 | Fire Suppression* |
| Oct 16 | Intro to Project |
| Oct 23 - Nov 13 | Lab Activities for Project |
| Nov 27 | Presentation on Proposed Design |
| Dec 4 | Lab Activities for Project |
| Dec 11 | Experiments |
| Dec 18 (10 am) | Final Paper Due |

* Assignment due on this topic

# Project Overview

## Building Requirements

The goal of this project is for each group to design and build a 'safe' small-scale student living space. The design should seek to:

- Provide early detection of the fire
- Suppress the fire so it does not spread to the front room

Group results will be compared based on the achievement of goals (see "Goals").

### General Requirements

| Requirement | Details |
|---|---|
| Money | Each team may spend up to $50 for materials used for the project. All materials must be accounted for, even if donated or free samples. |
| Structure | The structure will be 24"x16", with a ceiling height of 9". Walls, floor and ceiling will be comprised of provided materials. There will be two rooms: one 16"x16", the second 8"x16". The wall separating the rooms needs to have a doorway (6.5"x2.5"). |
| Openings | There must be 1 doorway (6.5"x2.5") leading out of the front room of the compartment (to outside) and at least 1 window (from each room). Any window must be at least 1.5" wide; any one window cannot exceed 8 sq. in., total window area cannot exceed 12 sq. in. |
| Furniture | Each team must have the at least the fuel load associated with the furniture specified in the "Furniture Requirements" section. |

### Furniture and Flooring Requirements

Each team must build and furnish their room with the following furniture. The furniture must be representative of real furniture, so materials selected for furniture must include wood frame and soft materials where cushions would be present, i.e. should be similar to materials used in **real life.** Misc. other contents (cloths, books, paper, etc.) should also be represented. The floor covering for each room should be a "carpet", either comprised of an actual carpet sample or other textile.

| Qty. | Furniture | Size (LxWxH in inches) |
|---|---|---|
| Back room (16x16) | | |
| 2 | Beds | 6x4x2 |
| 2 | Desks | 5x3x4 |
| 2 | Dressers | 2.5x1.5x4 |
| Front room (8x16) | | |
| 2 | Chairs | 2.5x2.5x2 |

### Goals

Designs of the room and suppression/detection systems, should consider the following design goals:

| Goal | Metric |
|---|---|
| Minimize the cost of materials | Money spent |
| Reduce fire spread | Time of fire spread to object in front room |
| Minimize fire severity | Percentage of total mass loss |
| Rapid detection | Minimize the time to fire detection |