**Overview**

F 425 is a senior-level course examining concepts important to the management of fire and fuels in wildlands. Students will develop an advanced understanding of the principles underlying prevention, control, and use of wildland fires. The course will enhance students’ technical skills in fire behavior modeling, prescribed fire, fire management planning, fuels treatments, and fire use in resource management. It will also encourage thoughtful discourse on the future of fire management under an altered climate, land use change, and increasing human demands on natural resources. This course is appropriate for both students interested in pursuing fire management careers and those interested in pursuing graduate study in wildland fire management.

**Course Objectives**

By the end of this course you will have acquired:

1. A complete understanding of combustion and the principles of fire behavior, with an appreciation of the utility and the drawbacks of fire behavior and fire danger models.
2. Computer skills for predicting fire intensity, rate-of-spread, crown-fire potential, and fire effects, with an emphasis on the cutting-edge, GIS-based fire spread tools such as FARSITE and smoke-dispersion models.
3. An understanding of the changing roles for fire managers in the US, and the background to contribute productively to current policy debates.
4. Experience with the techniques used to plan fire activities for a management unit, to evaluate the outcome of prescribed fires, and to manage adaptively to achieve resource objectives.
5. The ability to evaluate the potential benefits and hazards of mechanical fuel treatments, prescribed fire, and let burn policies for the restoration of sustainable ecosystems.
6. An understanding of how weather patterns affect fire behavior, expertise in the analysis of synoptic weather maps, and the ability to calculate and interpret fire danger ratings.
Course Organization/ Approach

This course meets twice a week, primarily in Forestry 127, but some Wednesdays we will meet in the computer lab (NR 232-west). Classroom sessions will combine lecture, discussion, and other exercises. Laboratory assignments will focus on the application of key concepts to real-world management scenarios. You will write a prescribed fire plan, an exercise which will integrate the skills you have accumulated in F424 and F425. An independent research project will offer you the opportunity to tackle a fire management problem of personal interest to you. Student lead discussions on current topics will provide the opportunity to explore management issues in depth. The course is designed to be flexible to cover topics that are of particular interest to you, so please communicate your interests and ideas to the professor.

Note that we will wrap up the course by the end of April to accommodate those of you with summer fire jobs. No final exam.

Class discussions  On most Mondays, we will begin our session with a discussion of a current topic in fire management. These will be student led discussions on student chosen topics. Each member of the class will be assigned a day to lead. Leading a discussion involves:

a) Choosing an article for the class to read. Recommended sources for articles include Fire Management Today (http://www.fs.fed.us/fire/fmt/), Advances in Fire Practice, and Scratchline. Check out the “Web Links” on the course RamCT site for ideas.

b) At least ONE WEEK IN ADVANCE, please post your reading assignment on the discussion board of RamCT. You may include any background information or questions you would like students to keep in mind.

c) On your discussion day, introduce your chosen discussion topic to the class and lead your classmates through an analysis of your issue. In some cases, you may like to present some background information to help give context to your discussion. Aim for about 15 minutes total (background presentation + discussion).

Readings  Please take the time to thoughtfully read the discussion articles that your classmates assign to you, and be prepared to discuss them. Other readings, which are provided by the instructor and accessible from the course calendar on RamCT, are intended to help you reinforce concepts presented in lecture. In some cases, these will be marked as reference or review materials, otherwise you should consider them required readings.

RamCT will serve as a central communication tool for this course. All students are expected to check RamCT regularly for announcements, changes to the schedule, and reading assignments. Student’s questions about course material and problem sets should be posted to the discussion board on RamCT. In this way, everyone can benefit from the instructor’s responses.

Laboratory problems: These will typically be started in class and, if not finished, will be due in class one week later. These are graded on effort--thoughtful and complete assignments will get a check (✓) which equals full credit. All the software used in this course is available free from the website http://fire.org/, and is installed in all the NR computer labs.

Individual Project: Deadlines will be posted on the course calendar throughout the semester for different phases of the individual project such as proposing a project topic, composing an
outline, and submitting a rough draft for instructor feedback (optional). Further guidelines will be provided later.

Tests: Two short tests will be administered during the semester to gauge your understanding of the material. While these should not be the source of major anxiety, keeping up-to-date on the lectures, homeworks, and readings, along with some review study, will be important to do well on these tests.

Participation: Students are expected to attend and participate in class. Sharing of personal views and experiences can greatly enhance the classroom environment; also, one student’s in-class questions likely reflect those of other students. Therefore, participation in class discussions and activities is a significant component of your grade. Students are advised that an especially strong or poor participation record can tangibly impact grades.

Methods of Evaluation

Student evaluation will consist of assignments, examinations, and participation weighted as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Class Participation/Discussion</td>
<td>10 pts</td>
<td>10 %</td>
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<tr>
<td>Problems / lab assignments</td>
<td>20 pts</td>
<td>20 %</td>
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<td>Burn Plan</td>
<td>20 pts</td>
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<tr>
<td>Independent Research Project and Presentation</td>
<td>30 pts</td>
<td>30 %</td>
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<tr>
<td>Tests and quizzes</td>
<td>20 pts</td>
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<td><strong>TOTAL</strong></td>
<td><strong>100 pts</strong></td>
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If the average grade for the course ends up below 80%, a curve will be applied to shift the average grade to about 80%. Otherwise, grades will follow typical grading percentages (90’s are As, 80s are B’s, 70’s are Cs, etc. with plus/minus applied to the highest/lowest grades within each decile.)
List of course topics

A. Fire behavior revisited. (Basic fire behavior is covered in F424, but this course offers more advanced modeling approaches and applications.)
   1) Digging deeper into the Rothermel equation
   2) Weather systems, fire weather, and teleconnections
   3) Post-frontal combustion, air quality, and smoke dispersion
   4) Modeling firebrands and extreme fire behavior
   5) Landscape-scale fire spread modeling with FARSITE
   6) Applications of FARSITE: planning and operations
   7) Alternative fire behavior modeling systems: Canada, Australia

B. Fire management problems: emphasis on fire use.
   1) Prescribed fire planning
   2) Fire management planning
   3) National Fire Danger Rating System
   4) Fuels treatments: strategic placement and effectiveness
   5) Restoration and Fire Regime Condition Class (FRCC)
   6) Monitoring and adaptive management
   7) Fire and climate/climate change
   8) Organizational sociology/high reliability organizations
   9) Leadership/careers in fire science

C. Independent research project, which will allow students to pursue a topic of their personal interest in depth.