Sample Syllabus and Schedule

FOR 557: Advanced Fire Behavior, 3 cr.

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Course Description

This course is designed to help students to understand the processes that control fire behavior in forest and rangelands as a basis to the management of wildfires and to the use of prescribed fire.

The students will start by learning the chemical and physical processes involved in the combustion of fuel particles and simple fuel beds, including understanding of the corresponding emissions and heat release.

Models for fire initiation and initial fire growth will be presented. Models for the steady-state spread of surface fires will be analyzed, from empirical and semi-empirical approaches based on the Rothermel equations to other models based on heat transfer physics. Crown scorch, crownfire initiation and spread, as well as spotting, are important topics also covered in the course.

The course includes the analysis of numerous examples and applications that illustrate the effect of fuels, slope and wind on fire behavior and indicate how this knowledge is important to predict fire effects. This information will allow the student to better predict fire behavior and to make better decisions related to management of both wildfires and prescribed fires.

Course Learning Outcomes

At the end of this course, you should be able to:

- Interpret fire behavior data
- Apply principles of chemical and physical processes to wildland fires
- Analyze the main factors affecting fire behavior using specific fire models
- Evaluate and apply models for surface and crown fires
- Apply models and interpret fire behavior predictions at ecosystem and landscape scales
- Evaluate and strategically apply the models of fire behavior in prescribed fire and wildfire management in a variety of global ecosystems

Reading materials

The contents of this course are aligned with the guide on **Fire Behavior Modeling** produced in 2012 by Joe Scott for FRAMES.

Additional required and suggested reading materials are referred to within each lecture.

Prerequisite Knowledge and Minimum Technical Skills

There are no specific prerequisites for this course. However, it is expected a basic level of knowledge in Chemistry, Physics and Statistics. The companion course FOR 451 on Fuels Inventory and Management is recommended. This course is delivered online so a good ability to use Internet resources is expected. It is also expected a good ability to use common spreadsheets as Excel and common software products to create and deliver presentations as Powerpoint. For the written assignments, research and writing skills at the senior level are also expected. A Writing Guide to assist you for Technical Papers and Lab Reports is available on the course website.

Expectations

For each of the 9 learning modules, you should spend an average of 3 hours reviewing the material provided. It is expected that you prepare your assignments (papers and presentations) and exams and turn them in on time. A reduction of 10% of the maximum points per week of delay will be applied.

Assignments

This course contains the following assignments:

Assignment 1: Module 1 Fire behavior concepts and predictions

Assignment 2: Module 2 Combustion

Assignment 3: Module 3 Physical Processes

Assignment 4: Module 4 Conduction

Assignment 5: Module 4 Convection

Assignment 6: Module 4 Radiation

Assignment 7: Module 5 Wind profile

Assignment 8: Module 6 Fire initiation

Assignment 9: Module 6 Initial fire growth

Assignment 10: Module 6 Steady state model

Assignment 11: Module 7 Models for crown fires

Assignment 12: Module 7 Models for spotting

Assignment 13: Module 8 Application software

Final Project

This course has for a last assignment a Final Project due at the end of the semester.

Academic Integrity

The University of Idaho strives to develop citizens who embrace the highest standards of ethical conduct, honesty and personal integrity in their personal and professional lives. The University therefore holds students to the highest standards of honesty and integrity in academic activity. In support of this goal, I will enforce the policies outlined in the University Of Idaho Student Code Of Conduct. In particular, plagiarism is a violation of both University rules and the rules of this class. Cheating or plagiarism of any kind will result in a zero on the assignment. This policy applies to all individual assignments, whether written or verbal. Note that university policy also requires instructors to refer all cases of academic dishonesty to the Office of the Dean of Students. Additional penalties may apply, particularly in the case of egregious or multiple offenses. To avoid problems, please cite all sources!

Disability Support Services Reasonable Accommodations

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services office located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course. Disability Support Services Contact information:

Phone: 208-885-6307
E-mail: dss@uidaho.edu
Website: www.uidaho.edu/dss

University of Idaho Classroom Learning Civility Clause

In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, and guests) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

SAMPLE SCHEDULE for ADVANCED FIRE BEHAVIOR

This schedule ties the learning **Modules,** the **Lectures** and the **Assignments** to their due dates in weeks from the start of the course. This course is planned for 30 hours of contact time (2 credits), divided in 9 modules (8 learning modules and 1 final evaluation) subdivided in 30 lectures. All assignments are due at midnight PT Sunday at the end of the week indicated.

The full course is planned for a total of 16 weeks, including time for the final assignments and evaluation. Students should set aside a sufficient amount of time each week to go through the Modules and complete the Assignments, but they may also work ahead, particularly in reviewing the Lectures.

Module 1: Introduction

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MMM DD, Sunday Midnight PT)*
    - Introduce yourself to your classmates
    - Concepts and predictions

Module 2: Chemical processes

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MMM DD, Sunday Midnight PT)*
    - Combustion

Module 3: Physical processes

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MM DD, Sunday Midnight PT)*
    - Physical processes

Module 4: Heat transfer mode

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MM DD, Sunday Midnight PT)*
    - Radiation
    - Conduction
    - Convection

Module 5: Main factors

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MM DD, Sunday Midnight PT)*
    - Wind profile

Module 6: Models for surface fires

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MM DD, Sunday Midnight PT)*
    - Fire initiation
    - Initial fire growth
    - Steady state model

Module 7: Models for crown fires & spotting

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MM DD, Sunday Midnight PT)*
    - Models for crown fires
    - Models for spotting

Module 8: Application software

- QUIZ: Self-Assessment
- ASSIGNMENTS ---- *(DUE MM DD, Sunday Midnight PT)*
    - Application software

Module 9: Final project

- FINAL PROJECT **--** *(DUE MM DD, Sunday Midnight PT)*