



Course Objectives / Overview

Although fires are typically viewed as ecologically destructive, wildfires and ecosystems have co-existed for millions of years. When is wildfire a disturbance and when is it just a perturbation of the ecosystem? How are vegetation, animal life and wildfires linked? This course will introduce students to the physical, environmental, and ecological factors influencing wildland fire behavior, as well as the biological attributes of species that determine the environmental outcomes of individual wildfires and the ecological significance and specific fire regimes. The roles of current land cover/use, land management activities, and climate change in shaping future fire regimes and ecosystem impacts will be discussed.

The specific objectives of the course are to provide the student with:

1. A comprehensive understanding of how fuel, topography and weather influence fire behavior.
2. Detailed information on the tenets of fire ecology and how they relate to plant and animal individuals and populations.
3. Integrated treatment of fire behavior and ecosystem responses so that community composition and ecosystem properties can be understood or predicted.
4. A synthetic view of how human land use, climate change, fire history and biophysical conditions lead to ecosystem development and change over time for regions of interest to the student.

Expected Course Learning Outcomes

Learning Outcomes:

1. Students will be able to describe how weather (temperature and winds) and topography affect combustion and fire spread across landscapes.
2. Students will be able to describe how fuel type, size, distribution and moisture affect fire behavior.
3. Students will be able to describe how different aspects of fire behavior affect vegetation and articulate how this selects for evolutionary traits in plants and behavior in animals.

INSTRUCTOR DETAILS:

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(301) 689-7109

Faculty name 2

[faculty email](#)
faculty phone number

Faculty name 3

[faculty email](#)
faculty phone number

Faculty name 4

[faculty email](#)
faculty phone number

CLASS MEETING DETAILS:

Dates:

Times:

Originating Site:

IVN bridge number:

(*****)

Phone call in number:

(***)

Room phone number:

(****)

CURRICULUM FULLFILMENT:

MEES *** fulfills a *** (PD, ISG, elective, etc.) MEES requirement.

Prerequisites

Insert here or state N/A

Teaching Assistant

TBD or N/A

4. Students will be able to describe the elements that define fire regimes and indicate how changing fire regimes impacts plant populations.
5. Students will be able to summarize and integrate the biophysical and ecological elements of the course to postulate how changing human land use, land management and climate are likely to affect fire regimes, plant populations and ecosystems.



Course Assessment / Grading

Participation in class discussions (and/or quizzes) (40%), Problem sets/assignments (30%), Course paper/project (30%).

Class discussions will be integral to the course. While there will be lecture materials, students are expected to interact with the instructor and each other in moderated discussion of each day’s materials. Students will present papers to the class and are expected to contribute at least one question for class discussion each week.

Quizzes will be given for the different sections of the course to verify understanding of important concepts and definitions. Since the course is designed to provide a synthetic understanding of how fire behavior and ecosystems interact, it is critical that concepts of each section are understood.

Tentative Weekly Course Schedule

[The format of this section will vary based on the design of your course, but our guidance is to aim for a clear and concise list and/or table that maps out all of the proposed list of topics to be covered and assignment assessments and deadlines to give students a sense of the course’s content, organization and logical sequence of events.]

Week	Date	Lecture Topic	Text Reading	Supplemental Reading
1	1/28/22	Course Introduction, Film – Fire Wars		

2	2/4/22	Combustion and Heat Transfer		Pyne et al. 1996 – Pages 3-24 Bowman et al. 2009
3	2/11/22	The Fire Environment; Topographic Influences; Basic Weather; Video	Schroeder and Buck; Chapter 1	http://meted.ucar.edu/fire/fwz/ Jolly et al. 2015; McKenzie et al. 2003;
4	2/18/22	Temperature/Humidity, Atmospheric Stability	Schroeder and Buck; Chapters 2, 3, & 4	http://meted.ucar.edu/fire/fwz/ Bessie and Johnson 1995 Running 2006; Westerling et al. 2006
5	2/25/22	Winds	Schroeder and Buck; Chapters 5-10	http://meted.ucar.edu/fire/fwz/ Agee 1997
6	3/4/22	Fuels; Fuel Moisture	Schroeder and Buck; Chapter 11	Brown 1974; Agee 1993 pages 42-52; Murphy et al. 2015
7	3/11/22	Fire Behavior/ First and Second Order Fire Effects	Cochrane and Ryan 2009	Bailey 1882; Cochrane et al. 1999; Ryan 2002
8	3/18/22	Plant Tolerance to Fires		Ryan et al. 1994; Bond et al. 2005
*****	3/25/22	<i>Spring Break</i>	*****	*****
9	4/1/22	Fire and Evolution in Plants		Mutch 1970; Schwilk and Ackerly 2001; Neary et al. 1999
10	4/8/22	Fire and Animals		McCullough et al. 1998
11	4/15/22	Plant Populations and Fire		Donovan and Brown 2007; Wellington and Noble 1985; Donato et al. 2006 – and resulting controversy
12	4/22/22	Human Land Use and Fire Regime Changes		Bowman 1998; Cochrane 2003; Smith et al. 2016
13	4/29/22	Plant Communities and Fire		Jackson 1968; Brooks et al. 2004
14	5/6/22	Landscape Ecology and Fire		Minnich 1983; Keeley 1999; Turner and Romme 1994

Required textbooks, reading and/or software or computer needs

No Text Book is required to be purchased. **Fire Weather** by Schroeder and Buck. 1970. (Will be provided in pdf form as it is out of print). Readings will be provided.

Optional Texts: (a) **Fire Ecology of Pacific Northwest Forests** by James K. Agee. 1993. Island Press. *This is an excellent overview of plant related fire ecology especially for those interested coniferous forests.*

(b) **Fire Vegetation and Dynamics** by Edward A. Johnson. 1992. Cambridge University Press. *This is an excellent short book on plant related fire ecology with particular emphasis on boreal forests.*

(c) **Introduction to Wildland Fire** by Stephen J. Pyne, P.L. Andrews and R.D. Laven. 1996. John Wiley & Sons, Inc. *This book is a great overview of fire behavior, fire management and fire ecology principles, but it will cost you an arm and a leg, so acquire this only if you are planning on having a professional fire-related library!*

Course Communication

Students should contact Instructors by email. Course announcements will be made via MOODLE and/or email. Discussion papers and other course materials will be available via Google Drive.

Resources

[Course website: www.moodle.com/xxxxx]

Campus Policies

The University of Maryland Center for Environmental Science has drafted and approved of various academic and research-related policies by which all students and faculty must abide.

Please visit <http://www.umces.edu/consolidated-usm-and-umces-policies-and-procedures> for a full list of campus-wide academic policies.

Course-Specific Policies and Expectations

Class discussions will be integral to the course. While there will be lecture materials, students are expected to interact with the instructor and each other in moderated discussion of each day's materials. Students will present papers to the class and are expected to contribute at least one question for class discussion each week.

Late work may be accepted for extenuating circumstances at the discretion of the instructors.