

JAN. 18 2001

GRANDE PRAIRIE REGIONAL COLLEGE
DEPARTMENT OF SCIENCE AND TECHNOLOGY

Bachelor of Applied Forest Resource Management

FOREST FIRE MANAGEMENT: FO3270

Transfer status: Under discussion

Pre-requisite: Forest Ecology (FO2020)

Calender Description:

The natural role of fire. Physics and chemistry of combustion. Fire behaviour, prediction, detection, suppression, prevention, control. Fuel types and fuel cycles. Fire danger rating. The elements of a fire control program. Prescribed burning.

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Lectures: Monday, Wednesday B305: 10:00 - 11:20
Lab: Tuesday B305: 14:30 - 17:20

Course Description:

The course reviews the attitudes to and the history of fire in Alberta. From being regarded as an unavoidable evil to the present ecosystem management strategy of trying to replicate the effects of fire.

The phases of combustion;

- preignition
- ignition
- combustion
- extinction

are examined in relation to the chemistry and physics of fuels.

Fire behaviour is considered as a function of:

- fuel state and abundance
- season
- wind
- topography

The ecological role of fire is looked at from a historical perspective. We will compare Tansley's pyral climax theory with Clement's monoclimax theory.

The special role of fire in the historical development of the lodgepole pine, jack pine and mixedwood forests of Alberta is compared with modern practices and beliefs. Fire dependent ecosystems are examined in terms of morphological and reproductive adaptations.

The history of fire as a cultural tool in Canada is traced from the European settlers to the present and fitted into the global scene.

The structure of fire management programs are viewed in general and the Alberta model in particular.

We will discuss the elements of a control program:

- prevention
- detection
- communication.

Fire suppression is looked at, with particular emphasis on safety in fire fighting.

Finally, we will discuss the use of fire as a silvicultural tool. Its strengths and also its weaknesses which have virtually eliminated its use in some jurisdictions.

TEXTS AND REFERENCES

RECOMMENDED

Pyne, S.J. 1996. Introduction to wildland fire. John Wiley & Sons, Inc. Toronto. 769 pp.

TEXTS AVAILABLE IN THE LIBRARY

Alexander, M.E. and G.F. Bisgrove. 1990. The art and science of fire management. Can. For. Serv., North. For. Cent., Edmonton. Inf. Rep. NOR-X-309. 333 pp.

Chandler, C., Cheney, P., Thomas, P., Trabaud, L. and D. Williams. 1983. Fire in Forestry, Forest fire management and organization. 2 Vols. John Wiley & Sons, Inc. Toronto. 450 pp., 98 pp.

Compendium of Canadian Forestry Statistics. (1996). Canadian Council of Forest Ministers.

Edmonds, R.L., Agee, J.K. and R.I. Gara. (2000). Forest Health and Protection. McGraw-Hill, Toronto. 630 pp.

Kimmins, J.P. 1997. Forest Ecology. Prentice Hall, New Jersey. Pages 296-314.

Murphy, P.J. 1985. History of forest and prairie fire control policy in Alberta. Alta En. And Nat. Res. Edmonton. ENR Report number, T/77. 408 pp.

Taylor, S.W., Pike, R.G. and M.E. Alexander. 1997. Field guide to the Canadian forest fire behaviour (FBP) prediction system. Can. For. Serv., North. For. Cent., Edmonton. Special Report 11. 60 pp.

SCIENTIFIC JOURNALS AND PERIODICALS AVAILABLE IN THE LIBRARY

Canadian Journal of Forest Research

Forestry Chronicle

Northern Journal of Applied Forestry

Silviculture

EXAMINATIONS

Midterm	35%
Assignments, reports, quizzes	30%
Final exam	35%

LECTURE SCHEDULE

The role of fire in the natural forest <ul style="list-style-type: none">- the changing situation in Alberta	1 lecture
The nature of fire <ul style="list-style-type: none">- phases of combustion- physics and chemistry of fuels	3 lectures
Fire behaviour <ul style="list-style-type: none">- how fires grow and spread- distribution of fires	6 lectures
Wildland fuels <ul style="list-style-type: none">- characteristics and histories	3 lectures
Fire weather <ul style="list-style-type: none">- importance of weather information in a fire danger rating system	4 lectures
Fire ecology <ul style="list-style-type: none">- species adapted to fire- Tansley's pyral climax theory- the effects of fire (or its absence) on succession	4 lectures
Cultural aspects of fire <ul style="list-style-type: none">- traditional- current	3 lectures
Fire management <ul style="list-style-type: none">- historical, economic and political considerations- fire management structure in Alberta	2 lectures
The elements of a fire management program <ul style="list-style-type: none">- prevention, detection, communication- management of the fuel load	5 lectures
Fire suppression <ul style="list-style-type: none">- evolution of control methods- the resources, manpower and equipment- organization of suppression activities- safety in fire fighting	6 lectures
Prescribed fire <ul style="list-style-type: none">- its different uses- techniques and tactics	3 lectures

LAB SCHEDULE

- Lab I** **Analysis of Alberta fire records**
- Statistical comparison of three periods
- pre - 1960, 1961 – 1983, 1984 - present
- Lab II** **Classifying fuel types**
- Assigning stand cover types to the appropriate fuel types under FBP system
- Lab III** **Fire Weather Index (FWI)**
- Working with the FWI portion of the Fire Behaviour Prediction (FBP) system.
- Three scenarios involving FFMC, DMC and DC. Vary precipitation while holding FFMC, DMC and DC constant.
- Lab IV** **The FBP module - wind direction and slope**
- Using the FBP module to get a sense of the interaction of slope and wind direction and their combined effect on Rate of Spread (ROS).
Effect of temperature and relative humidity on ROS
- Observe the combined effects of temperature and relative humidity by tracking a 24 hour sequence of hourly temperature and relative humidity readings from the Virginia Hills fire (1998).
- Lab V** **Fire behaviour – interactive session with Jeff Henricks (Fire Behaviour Specialist from Alberta L.F.S.).**
- Lab VI** **Effect of fire on opening of serotinous cones and its effects on seeds released from the cones**
- Use the muffle furnace to simulate the effects of fire. Oven settings of 300°C 350°C 800°C.
- Jack pine cones exposed to each temperature for 15 secs, 30 secs, 45 secs and 60 secs.
- Record numbers of seeds released at each temperature.
- Lab VII** **Preparation of seeds from lab V for germination tests.**
- Deyinging, separating empty from filled, scarification.
Note: The actual germination tests will be conducted by students at home. Results will be discussed during a regular lecture session.
- Labs VIII, IX and X** **Pumps, hoses and the use of foam, with Dave Brown (Fire Specialist formerly with Alberta L.F.S.).**
- All aspects of pumps, hoses and foam, including use, maintenance and "tricks of the trade."
Note: This session will run for 7 – 8 hours and will replace three of our normal lab sessions.
- Lab XI** **Identification of fuel types in the field.**
- This is a field lab, so come prepared.