

## **ENFP415 Fire Dynamics**

**Credits:** Three credits, two 75 minute lectures/problem solving sessions weekly

**Instructor:** Stanislav I. Stoliarov

**Textbook:** Quintiere J. G., *Fundamentals of Fire Phenomena*, John Wiley & Sons, Chichester, UK, 2006.

### **Specific course information:**

1. Catalog Description: This course is designed to give students a quantitative understanding of fire behavior. The fundamentals of physics and chemistry of combustion are presented and used to derive key analytical relationships that describe fire growth. Application of these relationships to the analysis of common fire scenarios is emphasized.
2. Prerequisites: Primary courses in thermodynamics, fluid mechanics and heat transfer.
3. Required Course.

### **Specific goals for the course:**

1. Upon completion of this course, students should be able to:
  - Demonstrate a working knowledge of basic physics and chemistry of premixed and nonpremixed flames
  - Compute the time to ignition of solid surfaces in a range of thermal scenarios
  - Estimate the rate of flame spread on solid objects
  - Perform calculation of steady state burning rate for liquid and solid fuels.
2. This course focuses on two SOs:
  - SO1 – An ability to apply knowledge of mathematics, science, and engineering.
  - SO5 – An ability to identify, formulate, and solve engineering problems.

### **Brief list of topics:**

Combustion Chemistry and Thermodynamics  
Premixed Flames  
Nonpremixed Flames  
Ignition of Liquids and Solids  
Flame Spread  
Burning Rate