

ENFP 630 Diffusion Flames and Burning Rate Theory

Credits: Three (3)

Contact hours: Two lectures per week, 75 minutes each

Table 5-1 category: N/A

Instructor: Sunderland

Textbook: S.R. Turns, D.C. Haworth, *An Introduction to Combustion Concepts and Applications*, McGraw Hill, New York, 4th edition.

Other supplemental materials: Various articles from peer-reviewed journals.

Catalog description:

Basic principles of diffusion flames for gaseous, liquid, and solid fuels. Droplet burning, B number, jet combustion, boundary layer combustion, generalized methods.

Prerequisites and Corequisites:

Prerequisite: ENFP 312 (Heat Transfer)

Table 5-1 Course Type: Optional

Specific outcomes of instruction:

Students will learn advanced diffusion flame theory, including thermodynamics, transport, heat transfer, and chemistry. Students will study and report on classic research papers from the discipline. Assessments will include homeworks, exams, and oral presentations.

Student outcomes assessed: N/A

Brief list of topics covered:

First law of thermodynamics; adiabatic flame temperature; Cantera equilibrium simulations; chemical kinetics; mass transport; conservation equations for reacting flows; conserved scalar formulations; droplet combustion; solids combustion; burning rate; stagnant film fires; Emmons problem; and turbulent fires.