



# Firing of Ceramics

**Instructor: Denis Brosnan**

## Instructor Bio



**Denis Brosnan, P.E., FACerS**, is a ceramic engineer specializing in processing, characterizing, and improving ceramic products while developing a specialization in forensic analysis. He is currently a consultant working on mineral issues, failure analysis, and historic materials characterization.

He previously taught courses in drying and firing of ceramics at Clemson University, worked for more than 20 years in industrial positions in refractories and technical ceramics, and coauthored the book *Introduction to Drying of Ceramics*.

Brosnan received the A. F. Greaves-Walker Award from the Society in 2016 and retired as the Bishop Endowed Chair Emeritus from Clemson University.

Brosnan holds a Ph.D. in ceramic engineering from Iowa State University.

## LESSON OUTLINE

### UNIT 1: FIRING CHANGES WITHIN THE CERAMIC

**Lesson 1: Introduction**

**Lesson 2: Chemical and Physical Characterizations used in Firing**

**Lesson 3: Use of Phase Diagrams**

**Lesson 4: Introduction to Clay Based Ceramics**

**Lesson 5: Firing of Whitewares**

**Lesson 6: Firing of Alumina**

**Lesson 7: Firing of Cordierite Ceramics**

### UNIT 2: FUELS, COMBUSTION, AND KILN THERMAL OPTIMIZATION

**Lesson 8: Intro to Kilns Fuels Combustion**

**Lesson 9: Fuel Combustion and Burners**

**Lesson 10: Combustion System Components**

**Lesson 11: Burner Control, Kilns, and Kiln Safety**

**Lesson 12: Solid Fuel Firing and Safety**

**Lesson 13: Refractories, Heat Storage, and Heat Loss in Kilns**

**Lesson 14: Kiln Simulation/Optimization Part 1**

**Lesson 15: Kiln Simulation/Optimization Part 2**

**Lesson 16: Kiln Simulation/Optimization Part 3**

**Lesson 17: Kiln Emissions and Firing Defects**