Design and Failure of Refractories: Thermomechanical Aspects - Course Outline

This course first addresses the theoretical aspects of thermomechanical behavior of refractories. The topics to be covered include elasticity, thermal expansion, thermal conductivity, thermal stresses, and thermal shock theory. After developing these fundamentals, case studies of the major refractory compositions will be discussed. Microstructural design as it applies to thermomechanical behavior will be emphasized. The lectures will be taught on the undergraduate senior level.

Who Will Benefit From This Course? *Engineers and scientists who are involved in the manufacturing, research and development, or consumption of refractory materials will find this course beneficial. An engineering background is helpful to take this course, although technical professionals may find the subject matter informative and useful.*

Lecture Number	Topics / Activities During Class
Lecture 1	Elasticity
Lecture 2	Thermal Expansion
Lecture 3	Thermal Conductivity
Lecture 4	Thermal Stresses
Lecture 5	Thermal Shock
Lecture 6	Thermal Shock
Lecture 7	Alumina-Silica
Lecture 8	Alumina-Silica
Lecture 9	Basic Refractories
Lecture 10	Basic Refractories
Lecture 11	Zirconia
Lecture 12	Composite
Lecture 13	Composite
Lecture 14	Monolithic
Lecture 15	Monolithic