

SCME 202 Basic Principle of Ceramics
Second Semester Academic Year 2021-2022
Faculty of Science, Mahidol University

Student Groups **Materials Science and Nano Engineering**
Class Schedule *Tuesday at 9:30-12:20 (lecture)*
Instructors *Prof. Dr. Nisanart Traiphol (Nisanart.t@chula.ac.th)*

Course Description

Covalent and ionic characters, structural properties of ceramics, synthesis and processing, mechanical-, electronic-, magnetic- and optical-properties of ceramics.

Grading Policy

Student evaluation is in accordance with the rules and regulations of the Faculty of Science, Mahidol University. Letter grades of A, B+, B, C+, C, D+, D, and F will be given according to the student's score.

For Lecture (100%):

Attendance/Participation	10%
Assignments	20%
Midterm Exam	35%
Final Exam	35%

Textbooks

Recommended

1. Introduction to Ceramics, 2nd Edition by W. D. Kingery, H. K. Bowen, D. R. Uhlmann
2. Fundamentals of Ceramics by M. W. Barsoum

Course Timetable

Date	Topics	Instructor
Jan 11, 2022	Introduction: Definition of ceramics, crystalline versus amorphous solids, traditional versus advanced ceramics	Nisanart
Jan 18, 2022	Bonding in ceramics: structure of atoms, ionic bonding, covalent bonding	Nisanart
Jan 25, 2022	Band theory of solids	Nisanart
Feb 1, 2022	Ceramic structures: ionic ceramics, covalent ceramics, silicates	Nisanart
Feb 8 and 15, 2022	Defects in Ceramics: Point defects, line defects, planar defects	Nisanart
Feb 22, 2022	Glasses: structure, formation, properties	Nisanart
	Midterm Examination	
Mar 8, 2022	Sintering: solid-state sintering, liquid phase sintering	Nisanart
Mar 15 and 22, 2022	Mechanical properties: stress, strain, fracture toughness, strength, creep	Nisanart
Mar 29 and April 5, 2022	Electrical properties: Dielectricity, capacitors, piezoelectricity, ferroelectricity	Nisanart
April 12, 2022	Magnetic properties: basic theory, Type of magnetism, hysteresis behavior	Nisanart
April 19 and April 26, 2022	Optical properties: basic principles, absorption, transmission, scattering	Nisanart
	Final examination	