**SCME 202 Basic Principle of Ceramics**

Second Semester Academic Year 2019-2020

Faculty of Science, Mahidol University

**Student Groups Materials Science and Nano Engineering**

**Class Schedule** *Tuesday at 9:30-12:20 (lecture)*

**Instructors**  *Assoc. 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**

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| **Date** | **Topics** | **Instructor** |
| Jan 19, 2021 | Introduction: Definition of ceramics, crystalline versus amorphous solids, traditional versus advanced ceramics | Nisanart |
| Jan 26, 2021 | Bonding in ceramics: structure of atoms, ionic bonding, covalent bonding, band theory of solids | Nisanart |
| Feb 2, 2021 | Ceramic structures: Ionic ceramics, covalent ceramics | Nisanart |
| Feb 9, 2021 | Ceramic structures: covalent ceramics, silicates | Nisanart |
| Feb 16, 2021 | Defects in Ceramics: Point defects, line defects, planar defects | Nisanart |
| Feb 23, 2021 | Glasses: structure, formation, properties | Nisanart |
| Mar 2, 2021 | Sintering: solid-state sintering, liquid phase sintering | Nisanart |
| Mar 9, 2021 | Revision | Nisanart |
|  | Midterm Examination |  |
| Mar 23, 2021 | Mechanical properties: stress, strain, fracture toughness | Nisanart |
| Mar 30, 2021 | Mechanical properties: strength, creep | Nisanart |
| Apr 7, 2021 | Electrical properties: dielectricity, capacitors | Nisanart |
| Apr 20, 2021 | Electrical properties: piezoelectricity, ferroelectricity | Nisanart |
| Apr 21, 2021 | Magnetic properties: basic theory, Type of magnetism, hysteresis behavior | Nisanart |
| Apr 27, 2021 | Optical properties: basic principles, absorption, transmission, scattering | Nisanart |
| Apr 28, 2021 | Revision | Nisanart |
|  | Final examination |  |