國立台灣科技大學 114學年 第2學期　課程大綱

Spring 2026 NTUST Course Outline

授課教師：蔡秉均

Instructor:Ping-Chun Tsai

課程名稱：陶瓷材料

Course Title：Introduction to Ceramics

2026/11/3

課程代號： ME5305701 Course Code 學分數： 3 Credits	必選修：選修/半學年 Required/Electve:Elective/Half Yr. 先修課程： Prerequisites
節次教室： Time/Location	M10(T3-718) M8(T3-718) M9(T3-718)
專業核心能力： Core Professional Competencies	
課程網址： Course Website	
課程宗旨： Course Objectives	Designed to provide students with the core understanding necessary to pursue the subject of physical ceramics. The course provides students to build a solid foundation in ceramics including the fundamental scientific background material needed for more advanced courses in ceramics and materials science. The nature of defects which intrudes upon the perfect geometry of ideal crystal structures, migration of matter and charge, chemical and phase equilibria are among the subjects discussed.
課程大綱： Outline of Lectures	1. Introduction of Ceramics Electronic ceramics, electrochemical ceramics, structural ceramics, energy ceramics, 2. Ceramic Crystal Structure Structure system, structure stability, ceramic structure 3. Defect Ceramics Point defects, defect equations, line and planar defects 4. Mass Transport in Ceramics Diffusion kinetics, diffusion equations, diffusion in ceramics, 5. Electrical Transport in Ceramics Electrical conductivity, ionic conductivity, electrochemical reaction 6. Phase Diagram in Ceramics Gibbs phase rule, binary phase diagram, ternary phase diagram 7. Microstructure of Ceramics Ceramic surface, ceramic interface, grain boundary
授課方式： Method of Instruction	講授 Lecture：80% 分組討論 Group discussion：0% 案例研討 Case study：20% 操做練習 Practical exercises：0% 講授 Lecture：%
教科書： Textbooks	Yet-Ming Chiang, Dunbar P. Birnie III, W. David Kingery," Physical ceramics : principles for ceramic science and engineering ", 3rd ed, John Wiley & Sons, Inc., 1997.
參考書目： References	Michel Barsoum, "Fundamentals of Ceramics", McGraw-Hill Series in Mat. Sci. and Eng., Int. Ed. 2020

修課須知： Notice	
評量方式： Grading	Quiz (or homework) x 8: 5 x 8 points; Exam x 2: 30 x 2 points
備註說明： Notes	It is better to have the basic knowledge of materials engineering and chemistry.