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：何慶炎

Instructor:

課程名稱：晶片封裝的電和熱效應

Course Title：Electric and Thermal Effects of Chip Packages

2026/11/3

課程代號： EN5808701 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： F2(TR-615) F3(TR-615) F4(TR-615) Time/Location	
專業核心能力： Core Professional Competencies	■ 具備自我求知能力 ■ 具備專業知識 ■ 具備跨領域整合
課程網址： Course Website	
課程宗旨： Course Objectives	Let learners understand the chip, molding compound, interposer, redistribution layer, underfill, solder balls, and substrate arrangements of various packaging methods, analyze and discuss the electrical and thermal characteristics of these arranged structures after packaging, in order to design packaging methods with the smallest size and power consumption, fastest computing speed, and signal transmission.
課程大綱： Outline of Lectures	(1) Small Outline Package (SOP). (2) Plastic Small Outline Package (PSOP). (3) Ceramic Small Outline Package (CSOP). (4) Shrink Small Outline Package (SSOP). (5) Thin Small Outline Package (TSOP). (6) Thin Shrink Small Outline Package (TSSOP). (7) Quad Flat Pack (QFP). (8) Thin Quad Flat Pack (TQFP). (9) Plastic Leaded Chip Carrier (PLCC) package. (10) Pin Grid Array (PGA) packages. (11) Flip-Chip Pin Grid Array (FCPGA) package. (12) Flip-Chip Ball Grid Array (FCBGA) package. (13) Chip-on-Wafer-on-Substrate (CoWoS) package. (14) Co-Packaged Optics (CPO) (15) Wire bonding package. (16) Fan-out with chip-last package on hybrid RDLs (redistribution-layers). (17) Fan-In Wafer-Level Chip-Scale Package (WLCSP). (18) 2D, 2.1D, and 2.3D IC Integration Package.
授課方式： Method of Instruction	講授 Lecture：80% 分組討論 Group discussion：0% 案例研討 Case study：0% 操做練習 Practical exercises：20% 講授 Lecture：%

教科書： Textbooks	Shichun Qu • Yong Liu, Wafer-Level Chip-Scale Packaging- Analog and Power Semiconductor Applications, Springer. John H. Lau, Semiconductor Advanced Packaging, Springer.
參考書目： References	Heat transfer: thermal management of electronics / Younes Shabany.
修課須知： Notice	
評量方式： Grading	Usual performance (attendance, class exercises) account for 80% of the grade, and report grades account for 20%.
備註說明： Notes	Equiped with basic knowledge of electricity and heat transfer.