國立清華大學課程大綱(Course Information)

科號 Course Number	CSR 540700	學分 Credit	2	人數限制 Class Size	40
中文名稱 Course Title	奈米世代封裝技術				
英文名稱 Course English Title	Packaging for Nanoelectronics				
任課教師 Instructor	余國寵(TSMC)				
上課時間 Time	W7W8	上課教室 Room	GEN III 綜三 LRA		

課程簡述(必填) (最多 500 個中文字) 本欄位資料會上傳教育部課程網

Brief Course Description (required) (50-200 words if possible, up to 1000 letters)

This graduate course provides a comprehensive overview on semiconductor advanced IC packages and packaging technologies across application domains of mobile computing, networking, and HPC/AI for engineering graduate students. Students will learn both theory and best practices of advanced packaging technology. After the class learning, students are expected to be familiar with the fundamental aspects of advanced IC packaging technologies and packages in architecture, interconnect technology, materials system, thermal/mechanical/electrical characteristics, and reliability, to further prepare themselves for the future career and research work in semiconductor IC packaging area.

請輸入課程內容「中文暨英文關鍵字」至少 5 個, 每個關鍵字至多 20 個中文, 以半形逗點分隔 (必填)

Please fill in at least 5 course keywords (up to 40 letters for each keyword) and use commas to separate them.(required)

Advanced Packaging Technology (先進封裝技術), Advanced System Integration (先進系統整合), PPAC (Power, performance, Are, Cost 功耗,效能,面積,成本),Mobile Computing (行動運算), AI/HPC (人工智慧/高效能運算), Chiplets Integration (小晶片整合), Si Interposer (矽中介層),TSV (矽晶圓穿孔), 3DIC Stack (3 維晶片堆疊), InFO (Integrated Fan-out 整合扇出型封裝), CoWoS (Chip on Wafer on Substrate 晶片/晶圓堆疊暨基板整合).

課程大綱 Detailed Course Syllabus

● 課程說明(Course Description)

The lecture covers 6 chapters: Chapter1: Packaging Introduction; Chapter2: Mainstream

Packaging Technology; Chapter3: Packaging Interconnect Technology; Chapter4: Packaging Materials Systems; Chapter5: Advanced Packaging Technology, and Chapter6: Reliability. The course framework is systematically structured to facilitate the learning of core aspects of advanced IC packaging and package. The primary lecture materials are prepared based on books, published papers, and presentations from IEEE conferences and consortiums.

● 指定用書(Text Books)

Electronic Class Materials (電子化課堂教材) from instructor

● 參考書籍(References)

1.　"Embedded and Fan-out wafer and panel level packaging technologies for advanced application spaces"，IEEE Press and John Wiley & Sons, New Jersey, 2022, ISBN 978-1-119-79377-9
2. ULSI Semiconductor Technology Atlas, Chih-Hang Tung, George T.T. Sheng, and Chih-Yuan Lu, John Wiley and Sons, Inc., 666 pages, ISBN 0-471-45772-8, 2003
3.　"Electronic Packaging Science and Technology"，John Wiley & Sons, 2022, by King-Ning Tu, Chih Chen, and Hung-Ming Chen, ISBN- 978-1119418313

● 教學方式(Teaching Method)

 Class lecture with interactive Q&As

● 教學進度(Syllabus)

週次	授課內容
1	Course Logistics (0.5 hr) & Packaging Introduction (1.5 hr)
2	Mainstream Packaging & Packages
3	Packaging Interconnect Technology -1
4	Packaging Interconnect Technology - 2
5	Packaging Interconnect Technology - 3
6	Packaging Materials System - 1
7	Packaging Materials System - 2
8	期中考
9	Advanced Packaging & Packages -1
10	Advanced Packaging & Packages -2
11	Advanced Packaging & Packages -3
12	Advanced Packaging & Packages -4
13	Advanced Packaging & Packages -5
14	Advanced Packaging & Packages -6

15	Advanced Packaging & Packages -7
16	Advanced Packaging & Packages -8
17	Reliability (1.5 hr) & Course Conclusion (0.5 hr)
18	期末考週

● **成績考核**(Evaluation)

 Attendance (20%), Homework (10%), Midterm Exam (30%), Final Exam (40%)

● **敘明學生使用 AI 的規則**(Indicate which of the following options you use to manage student use of the AI)

   本課程無涉及 AI 使用

   Not applicable