Course Name: 奈米世代封裝技術
Packaging for Nanoelectronics

授課教授：余振華教授

1. **課程簡述 Brief Course Description**

   This graduate course aims to provide a comprehensive overview of semiconductor advanced IC packages and packaging technologies across application domains of mobile/5G, networking and AI/high performance computing for engineering graduate credentials. Students are expected to learn the fundamentals of advanced IC packaging technologies and packages to prepare themselves for the future career and research work in the area of semiconductor advanced IC chiplets system integration.

2. **此科目對應之系所課程規畫所欲培養之核心能力**(Core capability to be cultivated by this course)：

   - Understand the advanced IC packaging applications in mobile/5G, networking and AI/HPC and fundamentals of package design: power efficiency, performance, formfactor and cost (aka PPAC)
   - Understand fundaments of package in architecture, integration and process, interconnect and interface, materials and reliability
   - Enable future engagement in career and research work of advanced node chiplets system integration

3. **課程內容關鍵字(Key Words)：**

   Advanced Packaging Technology (先進封裝技術), Mobile Computing /5G (行動運算/5G), 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 (整合扇出型封裝)

4. **課程大綱 Detailed Course Syllabus**

   ● 課程說明(Course Description):

   The lecture covers 6 chapters: Packaging Introduction, Mainstream Packaging, Packaging Interconnect Technology, Packaging Materials Systems, Advanced Packaging, and 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)

   ● 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

● 教學進度(Syllabus): (Might be adjusted)

週次	授課內容
1	Course Outline & Logistics
2	Packaging Introduction
3	Mainstream Packaging & Packages
4	Packaging Interconnect Technology -1
5	Packaging Interconnect Technology - 2
6	Packaging Interconnect Technology - 3
7	Packaging Materials System - 1
8	Packaging Materials System - 2
9	期中考
10	Advanced Packaging & Packages -1
11	Advanced Packaging & Packages -2
12	Advanced Packaging & Packages -3
13	Advanced Packaging & Packages -4
14	Advanced Packaging & Packages -5
15	Advanced Packaging & Packages -6
16	Advanced Packaging & Packages -7
17	Reliability (1.5 hr) & Course Conclusion (0.5 hr)
18	期末考週

● 成績考核(Evaluation):

Attendance (20%), Midterm Exam (30%), Final Exam (50%)