

EE6610 INTEGRATED CIRCUIT (IC) PACKAGING

Acad. Units: 3
Pre-requisite: Nil
Effective: AY 2014-2015 Sem 2
Last update: 8 Oct 2013

LEARNING OBJECTIVE

This course aims to provide a deep understanding of the fundamental principles underlying the core technology of integrated circuit (IC) packaging for graduate students, and build-up their ability in IC packaging design, materials, thermal management, fabrication and characterization. The course will also provide essential basic principles in novel areas, such as MEMS, microfluidics and biosensors.

CONTENT

Introduction to IC & microsystems packaging. Fundamentals of electrical packaging design. Fundamentals of thermal management. Single chip and multichip packaging. IC assembly, sealing and encapsulation. Microsystems packaging and advanced packaging. Failure analysis & Reliability.

COURSE OUTLINE

This course covers the essential principles, techniques and examples of practical usage of both essential and advanced packaging methods. These will cover a large range, from standard applications (such as IC packaging which is very relevant and widely used in industry) to novel specialized applications (such as MEMS and biosensors) and to modern trends such 3D systems, stacking, multichip and systems-on-chip packaging.

LEARNING OUTCOME

Students will acquire the knowledge of packaging principles of many various types of ICs and microsystems. The target is for the students to understand not only how traditional IC packaging is done and what techniques are used for this purpose, but also to learn about and assimilate other advanced applications, such as multichip packaging; system-on-chip packaging; 3D & stacking solution; MEMS, microfluidics & biosensors packaging. This will form a solid know-how base with notions relevant for practical applications in both industry and research.

ASSESSMENT SCHEME

Continuous Assessment:	20 %
Final Examination:	80%

TEXTBOOKS

1. Rao R. Tummala, Introduction to system-on-package (SOP): miniaturization of the entire system, McGraw-Hill, 2008.
2. Rao R. Tummala, Fundamentals of Microsystems Packaging, McGraw-Hill, 2001.

REFERENCES

1. Yufeng Jin, Introduction to microsystem packaging technology, CRC Press, 2011.
2. John H. Lau, Advanced MEMS packaging, McGraw-Hill, 2010.
3. Richard K. Ulrich, Advanced electronic packaging, 2nd ed., Wiley, 2006.