

ECE4755 Course Syllabus

ECE4755

Electronic Packaging Substrate Fabrication (1-0-6-3)

CMPE Degree

This course is Elective for the CMPE degree.

EE Degree

This course is Elective for the EE degree.

Lab Hours

6 supervised lab hours and 0 unsupervised lab hours

Prerequisites

MATH 2401- Calculus III and MATH 2403 - Differential Equations and CHEM 1211K - Chemical Principles

Corequisites

None

Catalog Description

Hands-on instruction in interconnect design, substrate material selection and properties, photodielectric deposition, via formation and photolithography, copper metallization, and substrate testing. Crosslisted with CHE 4755.

Textbook(s)

Tummala, *Fundamentals of Microsystems Packaging*, McGraw Hill, 2002. ISBN 0071371699, ISBN 9780071371698 (required)

Course Outcomes

Upon successful completion of this course, students should be able to:

1. Describe why and how devices and systems are packaged
2. Design and Layout multilayer organic Substrate
3. Explain role polymer materials as dielectrics and copper as conductors
4. Perform Laser and photo processes for microvia formation in polymer dielectrics
5. Perform lithography process methods
6. Describe microvia copper metallization by electroplating technologies
7. Analyze the role of passive components (capacitors, inductors and resistors) in circuits
8. Perform inspection, metrology and substrate testing
9. Learn to operate tools and handle chemicals safely

Student Outcomes

In the parentheses for each Student Outcome:

"P" for primary indicates the outcome is a major focus of the entire course.

"M" for moderate indicates the outcome is the focus of at least one component of the course, but not majority of course material.

"LN" for "little to none" indicates that the course does not contribute significantly to this

outcome.

1. (P) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. (M) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. (LN) An ability to communicate effectively with a range of audiences
4. (LN) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. (LN) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. (P) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. (LN) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline

1. Introduction to Packaging (including PRC SLIM)
2. Lab Safety
3. Interconnect Design
4. Polymer Deposition
5. Via Formation
6. Metallization
7. Substrate Testing