

## **ECE/ME 4754 Electronics Packaging Assembly (Elective)**

**Catalog Description:** ECE/ME 4754 Electronics Packaging Assembly (3-0-3)  
Prerequisites: ECE 3040 Microelectronic Circuits or ECE 3710 Circuits and Electronics  
Crosslisted with ECE, ME, and MSE.  
The course provides hands-on instruction in electronics packaging, including assembly, reliability, thermal management, and test of next-generation microsystems.

**Textbook:** Rao R. Tummala, Madhavan Swaminathan, *Introduction to System-on-Package (SOP)*, McGraw-Hill, 2008.  
Rao R. Tummala, *Fundamentals of Microsystems Packaging*, McGraw-Hill, 2001.

### **Topics Covered:**

1. Introduction to System-On-Package
2. Introduction to packaging and assembly and its interdisciplinarity: electrical, mechanical, thermal, materials, chemical processes
3. Thermo-mechanical modeling and design for reliability of interconnections
4. Flip-chip assembly materials and processes
5. Heat transfer and thermal management
6. Non-destructive inspection
7. Failure analysis
8. Laboratory safety

### **Course Outcomes:**

Outcome 1: Students will understand why and how any semiconductor device is packaged and assembled.

Outcome 2: Students will understand interdisciplinarity of packaging involving electrical, mechanical, thermal, materials, and processes.

Outcome 3: Students will understand the role of interconnection and assembly materials to meet electrical and mechanical requirements.

Outcome 4: Students will understand the need for thermal management and various heat transfer mechanisms.

Outcome 5: Students will understand the electrical failure mechanisms due to fatigue behavior of metals.

Outcome 6: Students will understand chemical safety in handling a variety of chemicals.

**Correlation between Course Outcomes and Student Outcomes:**

<b>ME 4754</b>											
	Mechanical Engineering Student Outcomes										
Course Outcomes	a	b	c	d	e	f	g	h	i	j	k
Course Outcome 1	X		X		X						
Course Outcome 2	X	X	X	X	X						
Course Outcome 3	X		X		X						
Course Outcome 4	X	X	X		X						
Course Outcome 5	X		X		X						
Course Outcome 6			X			X					

**GWW School of Mechanical Engineering Student Outcomes:**

- (a) an ability to apply knowledge of mathematics, science and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- (d) an ability to function on multidisciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- (i) a recognition of the need for, and an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

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