

Instructor: Prof. Janet K. Lumpp
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email: jklumpp@engr.uky.edu
Lecture: 2:00-2:50 PM, Mondays, Wednesdays and Fridays, 255 FPAT
Office Hours: Mondays and Wednesdays 1:30-2:00 and 3:00-3:30, or by appointment

Laboratory: Lab tours, demonstrations, company tours, and project lab sessions will be scheduled throughout the semester. Students are expected to participate in tours and team project work outside of class time.

Prerequisites: EE 211 or EE 305, EE 360 or MSE 402G, or consent of instructor.

Required Text: Fundamentals of Microsystems Packaging, Rao R. Tummala, McGraw-Hill, 2001.

Course Description: The purpose of this course is to study packaging systems which interconnect, support, power, cool, protect, and maintain electronic components. These systems are the primary determinants of the cost, reliability, size, and performance of typical electronic products. The course addresses systems at the chip, board and product levels. Topics include design, properties, materials, manufacture, and performance of various packaging systems. Laboratory sessions will provide familiarity with design software (Cadsoft EAGLE) and production equipment and processes.

Course Objectives: To gain an understanding of the relationships between manufacturing processes, design decisions, and performance of microelectronic assemblies. To develop the ability to select appropriate assembly technologies to meet design specifications in engineering applications. To develop laboratory skills for design, manufacture and test of surface mount circuit boards.

Expected Student Outcomes:

Upon completion of this course students should demonstrate the ability to:

1. Understanding of the relationships between manufacturing processes, design decisions, and performance of microelectronic assemblies.
2. Ability to select appropriate assembly technologies to meet design specifications in engineering applications.
3. Ability to apply laboratory and computer skills for designing, manufacturing, and testing surface mount circuit boards.
4. Knowledge of contemporary issues associated with electronic assembly.

Grading Policies: Grades will be based on numerical according to the weighting system listed below. Letter grades will be assigned based on a straight scale: $\geq 90\%$ =A, $\geq 80\%$ =B, $\geq 70\%$ =C, $\geq 60\%$ =D, $<60\%$ =E. Any curving of the grade scale will be made at the instructor's discretion.

HW	15%
Exam # 1	25%
Exam # 2	25%
Demo and Class Participation	10%
Term Project	25%

Homework will be assigned and graded. Exams will be closed book and will be given in class. **No makeup exams will be given without an excused absence in accordance with Students Rights and Responsibilities. Cheating and plagiarism can NOT be tolerated.** Plagiarism includes copying verbatim and paraphrasing published text. If you have any doubts or questions about what is acceptable, please consult the instructor before the assignment is due. Only individual work will be allowed on exams. Requests for regrading should be made in writing within one week after an assignment has been returned.

Tentative Exam Schedule

EXAM # 1	Monday, March 5, 2007
EXAM # 2	Friday, April 20, 2007
Term Project Presentations	Dead Week or Finals Week

Assignments

Written Assignments: Course assignments will emphasize technical writing. The subject matter involves a great deal of new terminology, many acronyms, and concurrent engineering issues. Writing about the material will reinforce the concepts and provide practice expressing technical ideas in written form. When using information that has been published, you must reference the source of the information (authors, journal, date published). Indicate the reference number at the end of a sentence containing information from that paper. Figures and tables may be reproduced from the source articles, and should have captions, legends and reference numbers. Papers must be typed or word processed. **No handwritten papers** will be accepted. Your papers will be evaluated based on content and organization. Proofread and spell check assignments before turning them in for grading.

Suggested journals available in the UK Libraries:

IEEE Transactions on Components and Packaging Technologies (Eng)
Journal of Electronic Materials (Eng)
Journal of Materials Science Materials in Electronics (Eng)
Journal of Materials Research (Chem/Phys)
Materials Research Society Bulletin (Chem/Phys)
Journal of Applied Physics (Chem/Phys)
Applied Physics Letters (Chem/Phys)
International Journal of Microcircuits and Electronic Packaging (JKL)

Suggested References: Engineering Library

The Electronic Packaging Handbook, Glenn R Blackwell, (Engineering Reference)
Electronic Materials Handbook, Volume 1, Packaging, ASM, (Engineering Reference)
Printed Circuits Handbook, Clyde Coombs
Multichip Module Technologies and Alternatives The Basics, Daryl Ann Doane, Paul D. Franzon
Hybrid Microelectronics Handbook, Jerry E. Sargent, Charles A. Harper
Hybrid Circuit Design and Manufacture, R. D. Jones
Modular Series in Hybrid Microelectronics, R. W. Johnson
Microelectronics Packaging Handbook, R. R. Tummala, E. J. Rymaszewski
Principles of Electronic Packaging, Seraphim, Lasky, Li
Surface Mount Technology, Prasad
Electronic Materials Handbook, Volume 1, Packaging, ASM International
Solder Paste in Electronics Packaging, Hwang
Soldering in Electronics, Wassink