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.

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: ≥90%=A, ≥80%=B, ≥70%=C, ≥60%=D, <60%=E. Any curving of the grade scale will be made at the instructor's discretion.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>HW</td>
<td>15%</td>
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<tr>
<td>Exam # 1</td>
<td>25%</td>
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<tr>
<td>Exam # 2</td>
<td>25%</td>
</tr>
<tr>
<td>Demo and Class Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Term Project</td>
<td>25%</td>
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</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Exam #</th>
<th>Date</th>
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<tbody>
<tr>
<td>EXAM # 1</td>
<td>Monday, March 5, 2007</td>
</tr>
<tr>
<td>EXAM # 2</td>
<td>Friday, April 20, 2007</td>
</tr>
<tr>
<td>Term Project Presentations</td>
<td>Dead Week or Finals Week</td>
</tr>
</tbody>
</table>

**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 Circuit Design and Manufacture, R. D. Jones
  - Modular Series in Hybrid Microelectronics, R. W. Johnson
  - 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