ELEG 4273 - ELECTRONIC MANUFACTURING PROCESSES

Fall Semester, 1995

Catalog Data: Introduction to manufacturing processes and concurrent engineering in the electronics industry. Survey
1995-96 of electronic components and products and the processes of fabrication and assembly. Principles of productivity, quality and economics. Emphasis on manufacturability. Two hours lecture, 2 hours laboratory per week. (Same as INEG 4513). Prerequisites: ELEG 3903 (ELEG 2103), INEG 3313 (STAT 3013) or consent.

Textbook: Electronic Manufacturing Processes, T. L. Landers, W. D. Brown, E. W. Fant, E. M. Malstrom, and N. M. Schmitt, Prentice Hall, Inc., 1994.

Coordinator: W. D. Brown, University Professor of Electrical Engineering.

Goals: To prepare engineers from varied disciplines for entry-level participation in the team environment necessary for successful competition in the world electronics industry. To introduce engineers to electronics manufacturing as a career. The industrial engineering student should expect to become familiar with electronics terminology, components, products and manufacturing processes. The electrical engineer should expect to become familiar with manufacturing processes, manufacturability requirements, quality and reliability considerations and the importance of these factors in the design process.

Prerequisites by Topic:

1. Basic probability and combinatorics.
2. Normal, binomial and exponential distributions.
3. Basic principles of electronic devices and circuits.

Topics:

1. Electronics industry perspectives and trends. (2 classes)
2. Electronic components. (4 classes)
3. Printed wiring board fabrication. (3 classes)
4. Through-hole insertion and assembly. (2 classes)
5. Surface-mount insertion and assembly. (3 classes)
6. Quality and reliability. (4 classes)
7. Testability. (2 classes)
8. Facilities and material handling. (2 classes)
9. Human factors. (1 class)
10. Production planning and control. (2 classes)
11. Production economics. (2 classes)
12. Tests. (3 classes)

Computer Usage:

1. Utilization of engineering workstation for process planning; simulation modeling of production systems; reliability, thermal, and producibility analyses.

2. Programming of IBM assembly robot, including off-line simulation checking on PC.

3. Life-cycle cost, learning-curve analysis on PC.

Laboratory Projects:

1. Printed wiring board design and producibility analysis. (4 weeks)

2. Electronics assembly workcell development and programming. (6 weeks)

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science:	2 credits or 67%.
Engineering Design:	1 credit or 33%.

The laboratory projects in PWB design and in workcell development and programming contribute to the design content.

Prepared By: W. D. Brown Date: January 15, 1996