

ETE 272

COURSE OUTLINE

Course Information	ABET Unit Classification (4 Quarter Units)
Department: ETE Course Number: ETE 272/L (<i>Earlier: ETP 272/L</i>) Course Title: Electronic Manufacturing, PCB manufacturing / Laboratory Revision Date: 03/5/05 Revised by: Thomas Thoen Compliant: Catalog 2004/05	Math: Basic Science: Engineering Topics: 4 <i>Contains significant design content:</i> (Yes) Other: Curriculum Designation: Required

I. Catalog Description

ETE 272 Electronic Manufacturing, PCB manufacturing / Laboratory (4)

Manufacturing and fabrication processes associated with the electronics industry. High-reliability testing. Bonding, joining, cabling techniques. PCB artwork and manufacturing techniques. 3 lectures/problem-solving and 1 three-hour laboratory.

II. Prerequisites and Corequisites

CAD (MFE 126 or equivalent), C- or better in ETE 204 and ETE 230.

III. Textbook and/or other Required Material

Villanucci, *Electronic Techniques*, Prentice Hall, 7nd ed., 2002.
<http://vig.prenhall.com/catalog/academic/product/0,1144,0130195669,00.html>

IV. Course Objectives

After completing this course the student will be able to:

1. Understand the concepts of project design, from concept to completion.
2. Understand the types and applications of different electronic components
3. Understand the design and application of printed circuit boards
4. Research new methods of manufacturing and new electronic devices
5. Learn to use modern software tools to design a printed circuit board and manufacture a product.
6. Work in a team setting to write reports and complete a design project

V. Expanded Course Description

A. Expanded Lecture topics:

1. Electronic components – functions, selection, package differences.
2. Examples of current product design, factors that affect design decisions based on manufacturing methods, costs and lead-times
3. Power supplies – principles of operation and design
4. Power – safety and protection using fuses / circuit breakers / gfi
5. Designing printed circuit boards (PCB's) with CAD techniques, filetypes, formats.
6. PCB materials
7. Discussion of types of PCB's, Single/Double-sided/Mutli-layer boards.
8. Photographic processes used in PCB design
9. Soldering techniques / prototyping methods
10. Surface mount technology – considerations / applications
11. Thermal considerations / heatsink selection criteria
12. System integration – methods / UL categories / enclosures

B. Example of Laboratory assignment:

Design of a project using a PCB created using a CAD program, including formal report and presentation at the end of the quarter.

VI. Class/Laboratory Schedule

3 sessions per week: Two 75-minute lectures and problem discussions. One 2 Hour 50 minute laboratory.

VII. Contribution of Course to Professional Component

Students learn the process of design, from concept to completion of a piece of working hardware. Students learn the importance of safety in regards to AC wiring and protection. Students learn about modern manufacturing techniques with Printed circuit boards and automation. Students learn how to use modern CAD software to design a project, and use an outside vendor to produce a product using CAM files. Students learn to work in a group setting to design and manufacture a device. Students document all aspects of the design. Students learn to write a research paper on a current manufacturing / hardware topic, and document their lab project to professional standards.

VIII. Evaluation of Students

The instructor evaluates outcomes using the following methods:

- Homework assignment submittals
- Examinations
- One-on-one discussions during office hours

The student grades are typically based on the following factors: quizzes, homework, midterm exams, lab assignments, final Exam

IX. Relationship of Course to Program Outcomes

Crse Obj	Program Outcomes										
	(a) Use of modern tools of discipl	(b) Use of math, science, Engg & Tech	(c) Do experi- ments	(d) Dsn of sys & compo nents	(e) Work on teams	(f) Do Tech probs	(g) Eff Com	(h) Life- long learn	(i) Prof, ethics, social resps	(j) Prof, soc, globl, diversity	(k) Qual, Cont impr, timeli ness
1				X					X		X
2		X		X							
3	X	X		X							
4	X				X		X	X			
5	X	X		X	X						
6	X			X	X		X				