

# Printed Circuit Board (PCB) Design

## ***ELE391: 3 Credits (Lecture 2 and Design 1) Professional Elective (4th Required)***

Instructor: Mike Smith, URI Class of 2001

### OVERVIEW:

Building on the fundamentals of electronic circuit design, Printed Circuit Board implementation approaches are introduced. The process of translating a conceptual design into a buildable, physical implementation, e.g. from whiteboard sketch to board in hand, will be covered. Laboratory exercises will supplement the lecture topics and culminate with the design, fabrication, assembly, and test of a moderate complexity PCB project.

### SELECTED TOPICS:

Component Libraries, Schematic Capture, Component Packaging, Design Considerations, Datasheet Interpretation, Component Placement, Stackup Planning, Power and Ground Planes, Material Selection, Routing Techniques, Via Design, Design Rules, Fabrication and Assembly Drawings, Design for Manufacturing, Testability, Decoupling, Return Currents, Differential Pairs, Length Matching, Controlled Impedance, IPC Specifications, PCB Manufacturing Process

### MOTIVATION:

Many interns and recent graduates have the necessary knowledge and skills to perform circuit design and breadboard implementation, but lack the ability to transition the design into a more production ready form. Understanding the PCB design and manufacturing process will allow students to more effectively integrate with Capstone sponsors and/or their future employers whether they will be performing all phases of the design, or merely overseeing portions of the process.

