Flex and Rigid-Flex Design for Manufacturability
SYLLABUS

INSTRUCTOR INFORMATION

Instructor: Nick Koop

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Best time to call: Usually available between 8AM-6PM Central Time USA.
Leave message anytime.

PROGRAM DESCRIPTION

In the highly competitive electronics industry, the knowledge and skills of staff directly responsible for the design and layout of Flexible and Rigid Flex Printed Circuit Boards (PCB) and Printed Board Assemblies (PBA) can have a direct impact on the success or failure of the product design and time to market. The IPC Flexible and Rigid Flex Design for Manufacturability course is designed to provide the skills necessary to create IPC compliant PCB designs to help you:

- Understand process and design differences between rigid and flex PCBs
- Understand material selections and tradeoffs
- Understand flexibility and bending constraints
- Design impedance across a changing circuit
- Understand how to incorporate HDI into your designs when needed

Taught by an IPC-certified industry expert with 40 years of experience in the field, this two-week program utilizes interactive webinars, on-demand recordings, and job-specific exercises to facilitate mastery of the key technologies involved in the design and fabrication of Flexible and Rigid Flex Circuits.

LEARNING AND PERFORMANCE OBJECTIVES

This program is designed to provide circuit board designers with a balanced foundation of theoretical knowledge and practical skills in printed circuit board design. Upon completion, participants will be able to:

- Maximize the value of implementing rigid flex in your system
- Understand the trade-off of various PCB materials in flex.
- Define a board stackup that can implement micro-vias.
- Recognize design and use risks to avoid
- Consider the impact of these concepts on end system packaging.

COURSE STRUCTURE

- Instructor and participants meet online twice per week from the comfort of their own home.
- Participants can view recorded online sessions to review course content and class discussions.
- Participants apply key concepts to create a real-world design from concept to completion.
- All required materials are included in the course.
- Course materials are accessible 24/7 on the new IPC Edge Learning Management System.
- The course can be accessed on virtually any device with an Internet connection and major web browser, including Chrome, Firefox, Safari, Edge, and Internet Explorer.

IPC STANDARDS COVERED (PROVIDED WITH COURSE)

- IPC-2223 SECTIONAL DESIGN STANDARD FOR FLEXIBLE/ RIGID-FLEXIBLE PRINTED BOARDS
- IPC-4202 FLEXIBLE BARE DIELECTRICS FOR USE IN FLEXIBLE PRINTED WIRING
- IPC-4203 COVER AND BONDING MATERIAL FOR FLEXIBLE PRINTED CIRCUITRY
- IPC-4204 FLEXIBLE METAL-CLAD DIELECTRICS FOR USE IN FABRICATION OF FLEXIBLE PRINTED BOARDS
- IPC-6013 QUALIFICATION AND PERFORMANCE SPECIFICATION FOR FLEXIBLE/RIGID-FLEXIBLE PRINTED BOARDS

COURSE SCHEDULE

WEEK 1 – SESSION 1: INTRODUCTION TO FLEX

Program overview outlining class schedule and options for accessing class materials and assignments. Class session will focus on IPC Standards, Materials, and Manufacturing Sequences.

Topics include:

- Introduction
- Benefits of Flex
- IPC Standards
- Material Options

- Cost Drivers
- Manufacturing Flow

WEEK 1 – SESSION 2: – BOARD CONSTRUCTION

Class session will focus on construction strategies and trade offs.

Topics include:

- Via Structures
- Annular Ring in Flex/Rigid Flex
- Coverlay Access
- Soldermask
- Stiffeners
- Strain Relief

WEEK 2 – SESSION 1: BALANCING ELECTRICAL AND MECHANICAL REQUIREMENTS

Class session will focus on design choices and impacts on electrical and mechanical performance.

Topics include:

- Impedance
- Flexibility Choices
- Copper Plating Types
- Rigid – Flex Transition Zone

WEEK 2 – SESSION 2: ADDITIONAL CONSIDERATIONS

Class session will focus on additional considerations on flexible and rigid flex printed board design.

Topics include:

- HDI in Flex/Rigid-Flex
- Procurement Documentation
- Terminations
- Avoiding Stress Risers in the Design
- Forming
- Arrays and Assembly