

AIM Photonics Academy

MITx online course: Photonic Integrated Circuits I

Fabless Design of Photonic Integrated Circuits within the AIM Foundry Ecosystem

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Course Description:

Introduction to the fabless design of silicon photonic integrated circuits (PICs). This six-week online course guides students through a step-by-step design process that completes with the tape-out of an application specific (*datacom, RF/analog, sensing and LIDAR*) PIC chip design to an AIM Photonics Multi-Project-Wafer (MPW) run. The course is structured around the investigation of an existing PIC chip that implements a basic “transceiver” (*fiber-coupler + modulator + detector*) but the circuits on the chip contain a few bugs. Students will learn how to diagnose the design issues and will learn best practices that will enable them to refine the chip design in order to meet application-specific PIC (AS-PIC) requirements. The course begins with the requirements for the application-specific PIC chip designs and reviews fundamentals of Silicon photonic devices (*waveguides, combiners/splitters, directional couplers, electro-optic modulators, and photodetectors*) from a circuit/system perspective (*component models*) and teaches Electronic-Photonic Design Automation (EPDA) principles (*Process Design Kits [PDK’s], design guides, hierarchical design and design validation*). Using these practical design skills, students will redesign the buggy PIC chip in the context of their application domains. The final designs will be validated using Design Rule Checking (DRC) and Layout-vs-Schematic (LVS). At the end of the course the student designs are submitted to an AIM Photonics MPW run (along with any required design waivers). The course will be followed up with a testing workshop (*at Rochester Institute of Technology [RIT] and AIM’s Test, Assembly and Packaging [TAP] facility*) where students will learn how to test and analyze the performance of the PICs designed in this course.

Course Offering: August, 2018 (start date to be finalized)

Course Registration: \$100 (subject to minor change)

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