Microelectronic Systems Education in the Global Economy Era

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Abstract

Currently, fewer ASIC designers are needed as before and the creation of intellectual property (IP) blocks is being performed in developing countries like India. As a result of this shift in design practices, a microelectronic design methodology that: (1) de-emphasize our traditional ASIC design and fab courses, and (2) concentrates on system integration of IP blocks for programmable SoCs such as XILINX VirtexII-Pro becomes an attractive alternative to more traditional ASIC style experiences. Both the University of New Hampshire and the University of Tennessee are restructuring our own curricula to respond to these challenges. We do not plan to eliminate entirely our custom VLSI courses which deal with physical level issues such as signal integrity, design for testability and design for manufacturability. However, we recognize that the number of ASIC design starts is continuing to go down while the number of FPGA designs is increasing. At the same time, we realize that globalization of engineering design means that many of the IP blocks needed for applications will be designed overseas, not in the USA. On the bright side, we believe that US designers will still be needed but will focus more on customizing FPGA platforms to the needs of local customers. Thus, we need to emphasize our FPGA-based courses even more than in the past and concentrate on providing students with team projects that sharpen their skills in developing specifications, integrating IP blocks and filling in new ones where needed, and in verification using both simulation and FPGA-based prototype boards. Because of collaboration, learning management tools, non-technical and technical components become equally important. Both centralized and global educational models are presented and collaboration scenarios proposed for consideration and discussion.