



**Embedded Electrical and Computer Engineering**

# **MASTER ORAL DEFENSE**

**TITLE:** *Embedded Systems Design Flow using Altera's DE2-115 T-Pad*

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**COMMITTEE CHAIR:** Dr. Hamid Mahmoodi

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## **ABSTRACT**

Embedded systems are the devices which involve both hardware and software design in one system simultaneously. There are diverse options of I/O ports that can be used in embedded systems including video, audio, camera, touch interface etc. In order to reflect these trends in education in a hands-on manner, a platform is needed that allows fast integration of hardware and software, rapid prototyping capability, and rich Intellectual Property (IP) library covering processor cores, I/O interface standards, arithmetic and signal processing functions, etc. The T-Pad Multimedia Development Kit, with the DE2-115 board embedding the Cyclone IV FPGA, as well as an LCD multimedia touch panel and a 5-Megapixel digital image sensor module, is a comprehensive design environment with everything embedded developers need to create multimedia-based systems. In this applied project, a set of example driven tutorials is developed for guiding students in use of the t-Pad board for embedded system development. The example evolve from simple I/O devices such as sliding switches to more complex examples involving touch LCD.