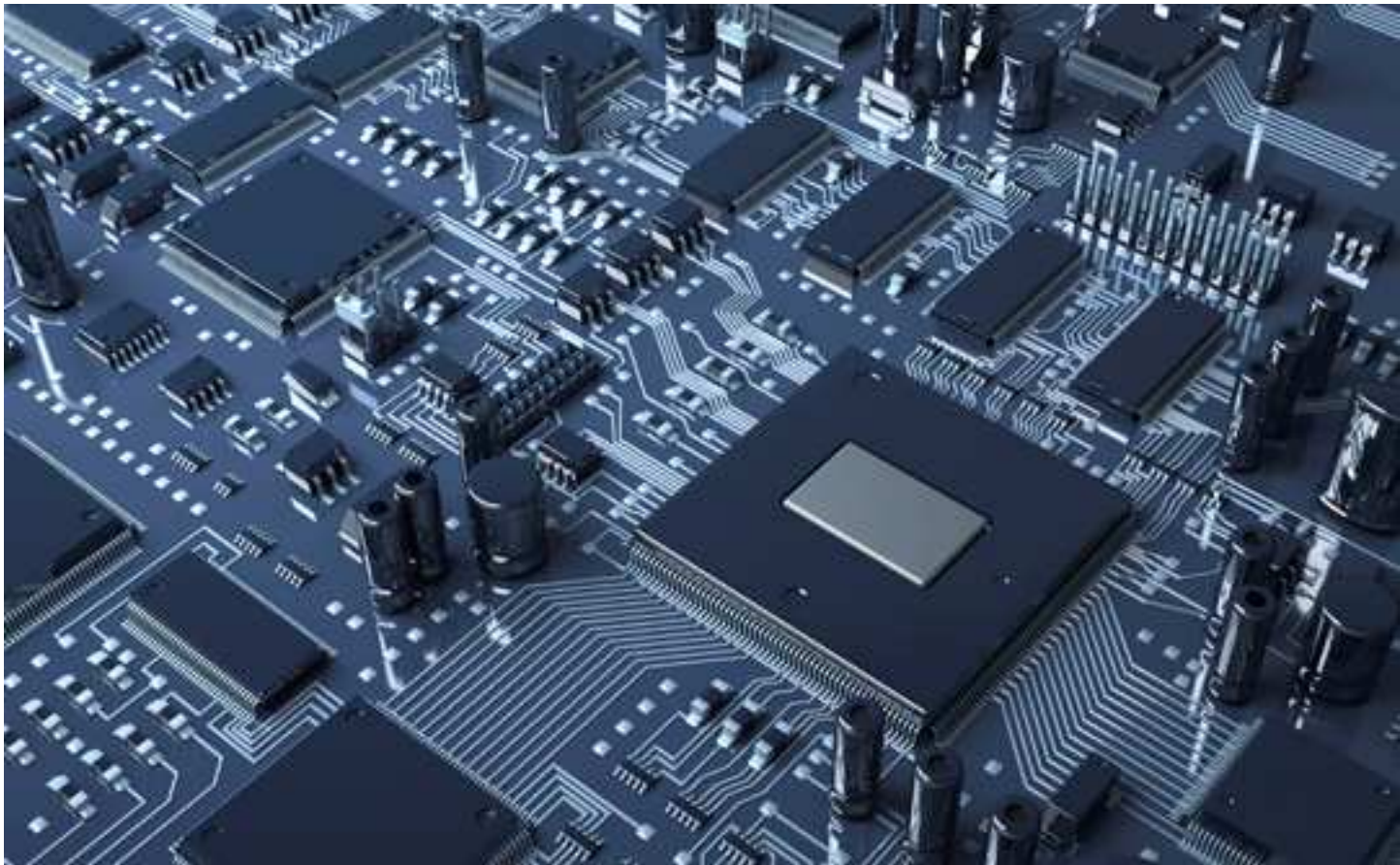


The Graduate Certificate in Firmware Engineering



Department of Electrical and Computer Engineering

Newark College of Engineering

New Jersey Institute of Technology

WHY PURSUE A GRADUATE CERTIFICATE IN FIRMWARE ENGINEERING?

Firmware denotes almost any programmable content of a hardware device. It is involved with very basic operations of a device that might be as complex as mobile phones, digital cameras and industrial robotics. As a firmware implementation platform, a Field-Programmable Gate Array (FPGA) is a reconfigurable semiconductor device programmed using a source code in a hardware description language (HDL). Popular applications of FPGAs include digital signal processing (DSP), software defined radio (SDR), and other complex electronic systems.

Field Programmable Gate Arrays (FPGAs) have become an industry standard to implement popular DSP and other algorithms in firmware. Many DSP algorithms previously implemented using application-specific integrated circuits (ASICs) and programmable digital signal processors (PDSPs) are now replaced by FPGAs. DSP hardware design has been moving from graphical design tools to HDL that led by Verilog and VHDL and both of these languages seem to be well suited for DSP with FPGA.

WHY STUDY FIRMWARE ENGINEERING AT NJIT?

NJIT's Department of Electrical and Computer Engineering (ECE) is at the hub of New Jersey's electronics enterprises. Educational and research programs are developed through interaction and growing partnerships with companies including AT&T, Alcatel-Lucent Technologies-Bell Laboratories, IBM, Sarnoff, Sun Microsystems, PSE&G, Globix, Telcordia, and Mitre Corp. With nationally-recognized research programs in wireless telecommunications, MEMS and nanotechnology, networking and Internet security, and generations of computing applications, the ECE department has several state-of-the art collaborative research centers including the Center for Communications and Signal Processing Research, Electronic Imaging Center, Microelectronics Research Center and an NSF Industry-University Co-operative Research Center (IUCRC) in Information Assurance.

WHAT WILL I LEARN?

A graduate certificate in Firmware Engineering provides students the foundations of digital signal processing to develop DSP Algorithms along with the necessary knowledge to implement them on FPGAs [ALTERA Cyclone II] using VHDL (VHSIC - Very High Speed Integrated Circuits -Hardware Description Language). The FPGA Lab is built around projects which include FIR-IIR Filter Design Implementation, Filter Banks, FFT Implementation, Error Control and Cryptography, Modulation and Demodulation, and Individual FPGA Term Project.

WHAT COURSES ARE OFFERED?

ECE 601	Linear Systems*
ECE 640	Digital Signal Processing
ECE 689	Digital System Design for Machine Arithmetic
ECE 698	Special Topics: Lab for Digital Signal Processing with Field Programmable Gate Arrays (FPGA)

Complete course descriptions can be found in the NJIT Online Catalog at <http://catalog.njit.edu/graduate>.

*Now or shortly available online.

Courses are subject to change.

√ Take care to select courses in proper order. Check course descriptions, because they state if one course must be taken before (i.e.; is a prerequisite to) another.

WHERE ARE THE CLASSES OFFERED?

Some courses are available online and all courses are available at NJIT's Newark campus. Customized NJIT degrees and academic certificates can be brought on-site to your company or customized and conducted at a location convenient to a consortium of companies.

WHAT IS THE TUITION FOR GRADUATE COURSES?

Use the tuition calculator to see the cost of your education quickly and easily. Visit:

<http://adultlearner.njit.edu/admissions/financialaid>

IS FINANCIAL AID AVAILABLE?

There may be sources of financial aid or tax credits available: <http://adultlearner.njit.edu/admissions/financialaid/index.php>

CAN THE GRADUATE CERTIFICATE BE APPLIED TO AN ADVANCED DEGREE?

Courses in the Graduate Certificate program in Firmware Engineering can be wholly applied to NJIT's MS in Electrical Engineering or MS in Computer Engineering.

HOW DOES THE GRADUATE CERTIFICATE PROGRAM WORK?

In any given year, NJIT offers a new slate of Graduate Certificates, each in a specific area which is in a fast growing and employable profession. Each stand-alone credential is a milestone in its own right and can be a 12-credit springboard to a matching Masters Degree program at NJIT or elsewhere. The credential can be completed in as little as one academic year of part-time study. Many can be studied online, in whole or partially. The straightforward and rapid admissions process requires possession of an undergraduate degree with a satisfactory grade point average. A GRE or GMAT score is not a pre-requisite. Depending on the program, courses can be taken online, on campus, or at NJIT extension sites around New Jersey. For a complete list of available Graduate Certificates, please visit: <http://www.njit.edu/gradcert>.

BRINGING A GRADUATE CERTIFICATE TO YOUR COMPANY

Arrangements can be made to bring a Graduate Certificate or Master's program on-site to your company. A customized Graduate Certificate can also be offered to match your company's area of technological and managerial specialty. For more information about Company Collaborative Graduate Certificates or enrollment in any of our Graduate Certificates, please contact Continuing Professional Education.

FOR FURTHER INFORMATION:

Division of Continuing Professional Education
1-800-624-9850 (Toll Free)
1-973-596-3060 (New Jersey)
Email: cpe@njit.edu

ON THE WEB:

<http://www.njit.edu/gradcert> / <http://cpe.njit.edu/mobi>

APPLY ONLINE:

<http://adultlearner.njit.edu/admissions>