EMBEDDED SYSTEMS CERTIFICATE, GRADUATE

Certificates are intended primarily for working professionals, and provide a "bite-sized" chunk of graduate coursework. See Professional Master of Computer Science (MCS) (http://catalog.ewu.edu/stem/cs-ee/computer-science-mcs/) for additional information.

Required Certificate Prerequisites—must be completed prior to admission.

CSCD 240	C AND UNIX PROGRAMMING	
or CSCD 255	C PROGRAMMING FOR ENGINEERS	
CSCD 260	ARCHITECTURE AND ORGANIZATION	
or EENG 260	MICROCONTROLLER SYSTEMS	
EENG 160	DIGITAL CIRCUITS	
MATH/HONS 161	CALCULUS I	
Certificate Requirements		
CSCD 561	EMBEDDED SYSTEMS	4
CSCD 562	EMBEDDED REAL-TIME CONTROL	4
CSCD 601	RESEARCH REPORT	4
Total Credits		**12**

Students who successfully earn a Embedded Systems, Graduate Certificate from EWU should be able to design and program embedded systems that make use of the following components and features:

- a microcontroller or microprocessor;
- actuators such as solenoids and relays;
- analog to Digital and Digital to Analog converters (ADC and DAC);
- asynchronous interrupts and Interrupt Service Routines;
- custom circuits designed with a Hardware Description Language and implemented in Field Programmable Gate Arrays (FPGA);
- embedded component communications such as I2C and SPI;
- environmental sensors such as temperature, light, proximity;
- PID Feedback Control;
- priority-driven pre-emptive multi-tasking;
- pulse Width Modulation (PWM);
- real-time deadlines for periodic and aperiodic tasks;
- timer circuits and real-time clocks.