

**1. Course number and name**

CptS 466: Embedded Systems

**2. Credits and contact hours**

3 credits, 3 lecture hours

**3. Instructor's or course coordinator's name**

Hassan Ghasemzadeh

**4. Textbook, title, author, and year**

J.W. Valvano. 2012. *Embedded Systems: Introduction to Arm Cortex-M Microcontrollers*, Volume 1 (5th ed.). ISBN-10: 1477508996; ISBN-13: 978-1477508992.

J.W. Valvano. 2011. *Embedded Systems: Real-Time Interfacing to Arm Cortex-M Microcontrollers* (5th ed.). ISBN-13: 978-1463590154; ISBN-10: 1463590156.

**5. Specific course information**

- a. *Catalog description*: The design and development of real-time and dedicated software systems with an introduction to sensors and actuators.
- b. *Prerequisites or corequisites*: CptS 360 Systems Programming; Good background on Operating Systems, C/C++ programming experience, and knowledge of microprocessors

**6. Specific goals for the course**

By the end of the course, students will be able to

- Design an embedded system using modular design and abstraction (1a, 1d, 2b, 2e, 2g, 6a, 6b)
- Design computer software on an embedded system for real-time processing such as real-time ADC sampling (1b, 1d)
- Debug and verify an embedded software program using a simulator and on the microcontroller (6b, 6d)

**7. Brief list of topics to be covered**

- Introduction to Computers and Electronics
- Introduction to Embedded Systems
- Introduction to the ARM Cortex-M
- Introduction to Input/Output
- Modular Programming
- Pointers and Data Structures
- Variables, Numbers, and Parameter Passing
- Serial and Parallel Port Interfacing
- Interrupt Programming and Real-time Systems
- Analog I/O Interfacing
- Communication Systems