Rowan University  
Department of Computer Science  

Course Proposal  

Embedded Systems Programming  

1. Details  

A. Course Title  
Embedded Systems Programming  

B. Sponsor  
Ganesh R. Baliga, Department of Computer Science.  

C. Credit Hours  
3  

D. Course Level  
Graduate  

E. Curricular Effect  
Restricted elective (Advanced Computer Science course) for computer science majors  

F. Prerequisites  
Operating Systems (0704.390)  

G. Suggested Time  
One section per year  

H. Resources  
Faculty, advanced lab facilities and library resources are adequate  

2. Rationale  

Nowadays embedded software is used in almost every electronic device, such as the digital watches, toaster ovens and security systems. The use of embedded software will proliferate to an even larger degree over the next decade. This course deals with the software issues that arise in the context of embedded systems programming. Since each embedded system is unique, this course will focus on the most common issues that an embedded systems programmer needs to be aware of. These issues include the complexities of device driver programming, multi-tasking, task synchronization with real-time constraints, and, development tools such as emulators, simulators and debuggers.  

3. Essence of the course  

a) Objectives in relation to student outcome  

Students will  
• Be able to study a newly designed embedded system and understand its programming interface  
• Be able to appreciate issues such as device driver programming and multitasking  
• Be able to design and implement software that programs a given embedded system.
b) Topic outline

- Popular embedded system architecture
- Embedded system programming interfaces
- Multitasking with real-time constraints
- Task synchronization
- Software efficiency issues
- Embedded system testing and debugging

c) Evaluation and grading procedure for students

Students will be evaluated based on homework, assignments and one or more tests.

d) Course Evaluation

The department curriculum committee will evaluate this course.

4. Results of consultation

The Department of Electrical and Computer Engineering has been given a copy of this course proposal. Results of consultation are awaited.
5. Catalog Description:

0706.4## Embedded Systems Programming 3 s.h.
(Prerequisites: 0704.390 Operating Systems)

Embedded software is used in almost every electronic device. This course deals with software issues that arise in embedded systems programming. Important concepts covered in this course will include device programming interfaces, device drivers, multitasking with real-time constraints, task synchronization, device testing and debugging, and embedded software development tools such as emulators and debuggers. These concepts will be applied to design and implement embedded software for one or more modest-sized embedded systems.