Rowan University  
Department of Computer Science  
Course Proposal  
Data Structures for Engineers

1. Details

A. Course Title  
   Data Structures for Engineers
B. Sponsor  
   Jennifer Kay, Department of Computer Science.
C. Credit Hours  
   3
D. Course Level  
   Undergraduate
E. Curricular Effect  
   Elective for Engineering Students
F. Prerequisites  
   Computer Science and Programming (0704.103) and Mathematics for Engineering Analysis II (1701.242)
G. Suggested Time  
   One section per year
H. Resources  
   Additional faculty may be required to teach this course

2. Rationale

The computer science department has proposed the addition of a laboratory component to our Data Structures course (1701.222) moving it from 3 to 4 s.h. Currently, many Electrical and Computer Engineering students take data structures. Furthermore, their expectation is that more students will be taking this course in the future. The Electrical and Computer Engineering department feels that their students can not add an additional s.h. to their load. This course will cover most of the material currently covered in the 3 credit Data structures course.

3. Essence of the course

a) Objectives in relation to student outcome

   Students will be able to:

   1. Define and implement Abstract Data Types  
   2. Use classes and objects  
   3. Evaluate the efficiency of algorithms  
   4. Write recursive functions  
   5. Use pointers and linked lists  
   6. Define and use a variety of common Abstract Data Types including:  
      Lists  
      Stacks  
      Queues

b) Topic outline
1. Designing Software
2. Software Reliability
3. Abstract Data Types, Classes, and Objects
4. Efficiency
5. Recursion
6. Lists
7. Stacks
8. Queues

e) 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 was consulted for this proposal.
5. Catalog Description:

0704.2XX Data Structures for Engineers 3 s.h.

I. (Prerequisites: 0704.103 (Computer Science and Programming) and (1701.242) Mathematics for Engineering Analysis II)

The course features programs of realistic complexity. The programs utilize data structures (strings, lists, graphs, stacks) and algorithms (searching, sorting, etc.) for manipulating these data structures. The course emphasizes interactive design and includes the use of microcomputer systems and direct access data files.