DO NOT TYPE IN THIS BOX

Bulletin #: _____

Academic Year: _____

FLORIDA INTERNATIONAL UNIVERSITY
UNIVERSITY CURRICULUM COMMITTEE
Proposal for a Course Change

PART I. FILL OUT THIS SECTION COMPLETELY

1. School/College Engineering and Computing

   Div./Dept. in Which Taught School of Computing and Information Sciences

2. | Alpha Prefix | 1st Digit | Last 3 Digits | "C"-lec-lab "L"-Lab | Cr. Hrs. |
   |---|---|---|---|---|
   | COP | 4 | 338 | | 3 |

3. Present Course Title Programming III

PART II. FILL OUT CHANGE INFORMATION ONLY

Change Effective 1 / 6 / 20 20

4a. New Course Title Systems Programming

b. New Abbreviated course Title *(for computer class schedules, transcripts)* Systems Programming

LIMITED TO 25 Characters *(including spaces)*

5a.

New Alpha Prefix	New 1st Digit	New Last 3 Digits	Change "C"-lec-lab "L"-Lab

5b. Change Credit Hours: From _____ To _____

6. New Catalog Description/Major Topics *(not to exceed 200 characters including spaces)*
   College of Medicine and College of Law: Attach description not exceeding 1,000 characters including spaces.

7. New Prerequisite(s): _____

8. New Corequisite(s): _____

9. Explain Reclassification Request:

   The current title "Programming III" does not convey the focus of this course. Since this course is geared towards the programming for system control, this change of course title is proposed.

10. Does this proposed change impact the assessment process of a program or certificate? If yes, then send notification to assessment@fiu.edu.

PROPOSAL REQUESTED BY:

Faculty Contact Nagarajan Prabakar (Type name) — (Signature) — 3 / 21 / 20 19

prabakar@cis.fiu.edu (Email address) — 305-348-2033 (Phone number)

Chairperson (Dept./Div.) S.S. Iyengar (Type name) — (Signature) — 3 / 21 / 20 19

Chairperson (Curr. Comm.) Cesar Levy (Type name) — (Signature) — / / 20 19

College/School Dean John Volakis (Type name) — (Signature) — / / 20 19

Submit one original form. Attach one copy of the course justification and course syllabus: course description, objectives, learning outcomes, major topics and textbooks.

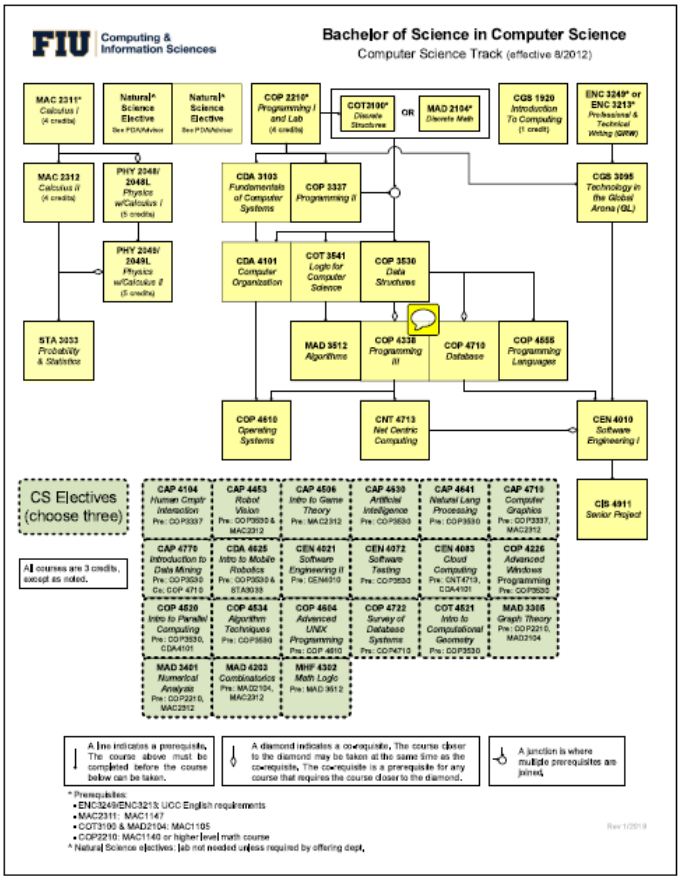
COP-4338 Systems Programming

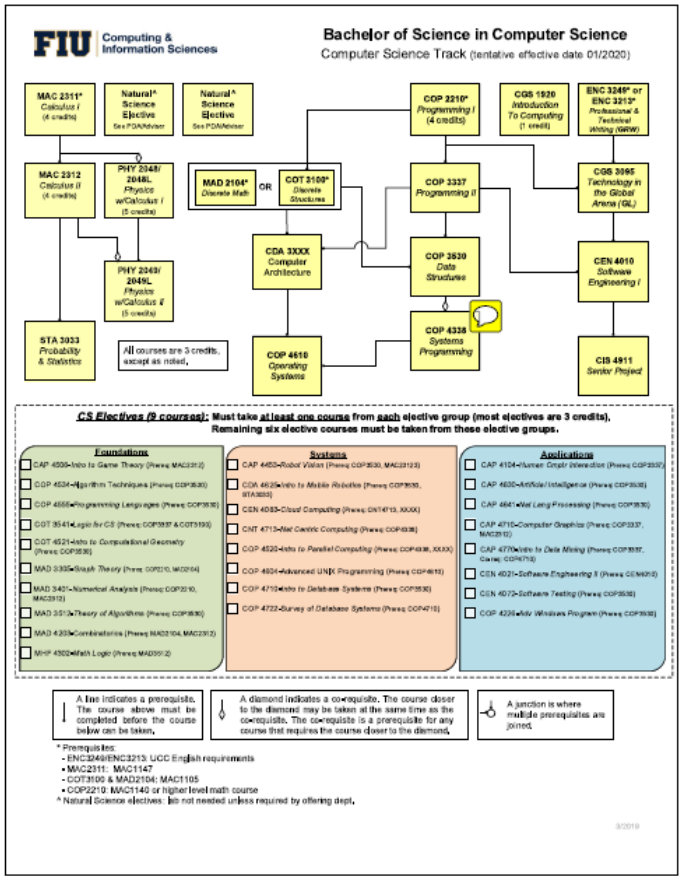
Course Change Justification

The present course title of COP-4338 is “Programming III” as in the left flowchart (present curriculum model) below. The main focus of this course to program system calls that is essential for the follow-up course COP-4610 (Operating Systems).

It is appropriate to change the title of COP-4338 to “Systems Programming” to reflect the content of the course as in the right flowchart (restructured new curriculum model) below.

This will enable new students to relate the course title meaningfully as well as it would imply correctly on student transcripts.





School of Computing and Information Sciences

Course Title: Systems Programming **Date:** 3/18/2019

Course Number: COP 4338

Number of Credits: 3

Subject Area: Programming	**Subject Area Coordinator:** Tim Downey **email:** downeyt@cs.fiu.edu
Catalog Description: Programming in C and advanced programming in Unix environments, including multiprocessing and multithreading. This course will have additional fees.	
Textbook: *The C Programming Language* (Kernighan and Ritchie), Prentice-Hall, 1988. ISBN: 0131103628.	
References:	
Prerequisites Courses: None	
Corequisites Courses: *COP-3530 Data Structures*	

Type: **Required**

Prerequisites Topics:

- Significant programming experience in a modern programming language
- From COP3337: Master arrays and multidimensional arrays

Course Outcomes:

O1. Master C basic types, arrays, and pointers
O2. Be familiar with the UNIX development environment, using utilities such as Makefiles, gcc, and gdb
O3. Master standard Input/Output
O4. Be familiar with process address spaces: Data, Heap, Code, and Stack
O5. Master dynamic memory management
O6. Master multithreading and synchronization
O7. Master writing program solutions to problems using the above features

School of Computing and Information Sciences
COP 4338
Systems Programming

Relationship between Course Outcomes and Program Outcomes

BS in CS: Program Outcomes	Course Outcomes
a) Demonstrate proficiency in the foundation areas of Computer Science including mathematics, discrete structures, logic and the theory of algorithms	
b) Demonstrate proficiency in various areas of Computer Science including data structures and algorithms, concepts of programming languages and computer systems.	1-7
c) Demonstrate proficiency in problem solving and application of software engineering techniques	7
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	1-7
e) Demonstrate understanding of the social and ethical concerns of the practicing computer scientist.	
f) Demonstrate the ability to work cooperatively in teams.	
g) Demonstrate effective communication skills.	

Assessment Plan for the Course & how Data in the Course are used to assess Program Outcomes

Student and Instructor Course Outcome Surveys are administered at the conclusion of each offering, and are evaluated as described in the School's Assessment Plan: http://www.cis.fiu.edu/programs/undergrad/cs/assessment/

School of Computing and Information Sciences
COP 4338
Systems Programming

Outline

Topic	Number of Lecture Hours	Outcome
• **C** o Basic types o Type conversions and casting o Pointers and Arrays o Standard I/O	6	O1, O2, & O3
• **UNIX** o Basic command line interface o Makefiles and gdb	2	O2
• **File I/O** o Parsing o Formatted I/O for file data	2	O3
• **Process Address Spaces** o Memory segments o Static vs dynamic segments o Segment scopes	2	O4
• **Concurrency** o Multiprocessing and IPC o Multithreading and synchronization	5	O6
• **Dynamic memory management** o Pointers o Memory allocation and deallocation	3	O5
• **Optional topics** o Sorting o Memory allocator o Socket programming o System calls o Parallel programming	5	

School of Computing and Information Sciences
COP 4338
Systems Programming

Course Outcomes Emphasized in Laboratory Projects / Assignments

Outcome	Number of Weeks
O1 & O2	2
O1 & O3	2
O3 & O5	3
O4 & O5	3
O6	2

Oral and Written Communication:

None

Social and Ethical Implications of Computing Topics:

None

Approximate number of credit hours devoted to fundamental CS topics

Topic	Core Hours	Advanced Hours
Algorithms:		0.5
Software Design:		1.5
Computer Organization and Architecture:		0.5
Data Structures:		1
Concepts of Programming Languages:		1.0

Theoretical Contents: None

School of Computing and Information Sciences
COP 4338
Systems Programming

Problem Analysis Experiences

6 Programming Assignments

Solution Design Experiences

6 Programming Assignments

The Coverage of Knowledge Units within Computer Science Body of Knowledge[1]

Knowledge Unit	Topic	Lecture Hours
OS 3	Concurrency (multiprocessing and multithreading)	5
OS 5	Memory management	5
OS 8	File systems and I/O	2
PF 3	Fundamental data structures	1

[1]See http://www.acm.org/education/curric_vols/cc2001.pdf Chapter 5 for a description of Computer Science Knowledge units