Knight Foundation School of Computing and Information Sciences

Course Title: Operating Systems Principles **Date:** 9/30/2019

Course Number: COP 4610

Number of Credits: 3

Subject Area: Computer Organization	**Subject Area Coordinator:** Dong Chen **email:** dochen@cs.fiu.edu
Catalog Description: Operating systems design principles and implementation techniques. Address spaces, system call interface, process/threads, interprocess communication, deadlock, scheduling, memory, virtual memory, I/O, file systems.	
Textbook: Operating System Concepts, 10th Edition Silberschatz, Galvin, and Gagne Wiley (ISBN: 1119800366)	
References:	
Prerequisites Courses: COP 4338 and (CDA 3102 or CDA 4101)	
Corequisites Courses: None	

Type: Required for CS Major

Prerequisites Topics:

- CPU, cache, memory organization
- Instruction set architecture
- Multithreading
- Fundamental data structures

Course Outcomes:

1. Master the functions and structures of operating systems
2. Be familiar with issues in the design of operating systems
3. Master techniques of memory management
4. Master file and storage systems
5. Master concepts of process synchronization and communication

Knight Foundation School of Computing and Information Sciences
COP 4610
Operating System Principles

Association between Student Outcomes and Course Outcomes

BS in Computing: Student Outcomes	Course Outcomes
1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	1, 2
2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	3, 4
3) Communicate effectively in a variety of professional contexts.	
4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.	
5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.	

Program Specific Student Outcomes

6) Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]	5
6) Apply security principles and practices to maintain operations in the presence of risks and threats. [CY]	
6) Use systemic approaches to select, develop, apply, integrate, and administer secure computing technologies to accomplish user goals. [IT]	

Assessment Plan for the Course and how Data in the Course are used to assess Student 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: https://abet.cis.fiu.edu/

Knight Foundation School of Computing and Information Sciences
COP 4610
Operating System Principles

Outline

Topic	Number of Lecture Hours	Outcome
• Overview ○ Operating system history ○ Computer-system organization ○ Operating-system structure	6	1, 2
• Process management ○ Processes ○ Threads ○ CPU scheduling ○ Process synchronization ○ Deadlocks	15	2, 5
• Storage management ○ Memory management ○ Virtual memory ○ File-system interface ○ File-system implementation	9	3
• I/O systems ○ I/O processing ○ Mass-storage structure	6	4

Course Outcomes Emphasized in Laboratory Projects / Assignments

	Outcome	Number of Weeks
1	Client-server project Process scheduling, queuing, I/O service Outcome: 1, 3, 5	6

Oral and Written Communication:

No significant coverage

Social and Ethical Implications of Computing Topics

No significant coverage

Knight Foundation School of Computing and Information Sciences
COP 4610
Operating System Principles

Approximate number of credit hours devoted to fundamental CS topics

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

Theoretical Contents

Topic	Class time

Problem Analysis Experiences

1. Critical section analysis

Solution Design Experiences

1. Synchronization of concurrent processes
2. Access to shared resources

Knight Foundation School of Computing and Information Sciences
COP 4610
Operating System Principles

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

Knowledge Unit	Topic	Lecture Hours
OS1	Role and history of operating systems, computer-system structures, client-server systems, hand-held systems	3
OS2	Operating-system components, services, structure, and implementation	5
OS3	Critical section, semaphores, process synchronization; deadlocks detection, prevention, and recovery	6
OS4	Processes, threads, CPU scheduling	9
OS5	Memory management, virtual memory	6
OS8	File-system interface, file-system implementation, I/O systems, mass-storage structure	6

[1]See https://www.acm.org/binaries/content/assets/education/cs2013_web_final.pdf for a description of Computer Science Knowledge units