School of Computer Science

Course Title: Operating Systems Principles **Date:** March 18, 2019

Course Number: COP-4610

Number of Credits: 3

Subject Area: Computer Systems	**Subject Area Coordinator:** S. Masoud Sadjadi **email:** sadjadi@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, 6th Edition Silberschatz, Galvin, and Gagne John Wiley (ISBN: 0471250600)	
References:	
Prerequisites Courses: CDA 3XXX(Computer Architecture) and COP 4338	
Corequisites Courses: None	

Type: Required

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

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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.	1,2,3,4
c) Demonstrate proficiency in problem solving and application of software engineering techniques	5
d) Demonstrate mastery of at least one modern programming language and proficiency in at least one other.	
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/

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Outline

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

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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

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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

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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 http://www.computer.org/education/cc2001/final/chapter05.htm for a description of Computer Science Knowledge units