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| **ELEMENT** | **CONTENT** |
| DEPARTMENT | CIS |
| AUTHOR (S) | Peter Chapin, CJ Wang |
| COURSE NUMBER | **CIS 4020** |
| COURSE TITLE | **Operating Systems** |
| SHORT TITLE | Operating Sys |
| COURSE LEVEL | 4000 |
| DATE CREATED |  |
| CHECKED/CHANGED | 2/9/2017 |
| PREREQUISITES | CIS 3050 |
| COREQUISITES |  |
| RESTRICTIONS |  |
| SPECIAL FEES | No |
| CREDITS | 4 |
| HOURS | 3 hours of lecture, 2 hours of lab per week |
| SEMESTER | Fall |
| COURSE DESCRIPTION | In this course, the student examines the internal workings of modern operating systems. Topics include multiprocessing, memory management, file systems, device drivers, distributed operating systems, and real time operating systems. As part of the course, the student writes a kernel module or a device driver for an operating system chosen by the instructor. |
| SUGGESTED TEXTS |  |
| OPTIONAL TEXTS |  |
| COURSE OUTCOMES | The successful student will be able to:   1. Understand common strategies operating systems use for managing processes, threads, and multiple processors, including the basics of real time systems 2. Understand how file systems are implemented by the operating system with emphasis on the structure and layout of those systems 3. Understand common strategies operating systems use for managing virtual memory 4. Write a non-trivial kernel module or device driver for a realistic operating system chosen by the instructor 5. Understand the difference between a monolithic system and a microkernel system 6. Understand the difference between a real time system and a non-real time system 7. Understand the basics of distributed operating systems 8. Work with other students on a group software project using industry standard software development tools |
| COURSE CONTENT | 1. Linux modules and overview of Linux source 2. Process and thread management strategies 3. Process creation, termination, and synchronization 4. Memory management with an emphasis on virtual memory management 5. Implementation of the Linux ext2 file system 6. Design and implementation of GenericFS 7. Other file system features and their implementations 8. Microkernel systems 9. Design and organization of QNX 10. Device drivers 11. Topics in distributed systems as time allows |
| LAB/STUDIO OUTCOMES | The successful student will be able to:   1. Implement operating system components (drivers and other types of modules) 2. Create or use simulation software to demonstrate operating system functionality in a controlled way 3. Collaborate with a team of peers on a medium-sized project |
| LAB/STUDIO CONTENT | 1. System calls 2. Process creation 3. Process synchronization 4. Memory management 5. GenericFS 6. QNX device drivers 7. Distributed systems |
| LECTURE CAPACITY | 32 |
| LAB CAPACITY | 16 |
| GRADED OR P/NP | Graded |
| EVALUATION | Attendance, participation, exams, quizzes, homework, lab reports |
| DELIVERY METHOD | LEC, LAB |
| ROOM REQUIREMENTS | CIS lab for lab |
| AUTHOR’S NOTES |  |