Syllabus for ITS-1600– Fundamentals of Modern Operating Systems

COURSE DESCRIPTION

Fundamentals of Modern Operating Systems introduces core concepts of modern operating systems. Topics include operating systems (OS) nomenclature, OS types, kernels, program execution, memory management, multitasking, device management, virtualization, scheduling, and interaction between computers and the services provided by operating systems hardware. The course also examines key cybersecurity concepts and techniques as applied to modern operating systems.

COURSE TOPICS

- What operating systems do
- Operating system structures
- Processes
- Threads
- Process synchronization
- CPU scheduling
- Main memory and virtual memory
- Mass storage structure
- File system interface and implementation
- I/O systems
- Backup and recovery
- Protection and security design principles
- Auditing
- Access controls
- Isolation
- Privileged states
- Authentication policies
- Intrusion detection
- Virtualization

COURSE OBJECTIVES

After completing this course, you should be able to:

CO 1 Classify the various operating system models.

CO 2 Analyze the techniques used by operating systems to manage processes.

CO 3 Explain how operating systems manage hardware.

CO 4 Discuss how network functions are managed within an operating system.

CO 5 Discuss how users are managed within an operating system.

CO 6 Explain the common techniques used by operating systems for memory management.

CO 7 Explain how various mass storage systems work.

CO 8 Explain various file management strategies.

CO 9 Discuss the role of security and ethics in operating system design and operation.

CO 10 Examine a current operating system implementation.

COURSE MATERIALS

You will need the following materials to complete your coursework. Some course materials may be free, open source, or available from other providers. You can access free or open-source materials by clicking the links provided below or in the module details documents. To purchase course materials, please visit the University's textbook supplier.

Required Textbook

- Silberschatz, A., Galvin, P. B., & Gagne, G. (2018). *Operating system concepts* (10th ed.). Wiley. **ISBN-13:** 978-1-119320913 (eBook)

Additional Readings

- Allan, M. (2023, February 14). *Six types of encryption that you must know about*. GoodCore.

- Kidd, C. (2022, November 29). *Data encryption methods and types: Beginner's guide to encryption*. Splunk.
- Krzyzanowski, P. (2022, April 13). *Firewalls and VPNs*. Rutgers.
- Loshin, P., & Cobb, M. (n.d.) *What is encryption?* TechTarget.
- Microsoft. (2008, September 11). *VPNs and firewalls*.

COURSE STRUCTURE

Fundamentals of Modern Operating Systems is a three-credit, online course, consisting of **seven** modules. Modules include an overview, topics, learning objectives, study materials, and activities. Module titles are listed below.

- **Module 1: Operating Systems Concepts and Structures**
  Course objectives covered in this module: CO 1, CO 2, CO 3, CO 4, CO 5, CO 6, CO 9

- **Module 2: Processes and Threads**
  Course objectives covered in this module: CO 2, CO 4

- **Module 3: Synchronization and Scheduling**
  Course objectives covered in this module: CO 2, CO 3, CO 4, CO 5, CO 6

- **Module 4: Memory Management**
  Course objectives covered in this module: CO 1, CO 2, CO 3, CO 4, CO 6

- **Module 5: Mass Storage Structure**
  Course objectives covered in this module: CO 3, CO 7, CO 8, CO 9

- **Module 6: File Systems and Input/Output Systems**
  Course objectives covered in this module: CO 7, CO 8

- **Module 7: Protection and Security**
  Course objectives covered in this module: CO 9

ASSESSMENT METHODS

For your formal work in the course, you are required to participate in online discussion forums, complete written assignments, and complete a final project. See below for details.

Consult the Course Calendar for due dates.

Promoting Originality—One or more of your course activities may utilize a tool designed to promote original work and evaluate your submissions for plagiarism. More information about this tool is available in this document.

Discussion Forums

This course requires you to participate in **11** graded discussion forums. There is also an ungraded but required Introductions Forum in Module 1. You can find the online discussion grading rubric in the Evaluation Rubrics folder in the course website.

For posting guidelines and additional help with discussion board assignments please see the Student Handbook located within the General Information section of the course website.

Written Assignments

You are required to complete **seven** written assignments. The written assignments are on a variety of topics associated with the course modules.

Final Project

For your final project you will examine a computer you work with regularly to indicate that: (1) you understand and can navigate the parts of the OS and (2) your system has the necessary security features or if it does not, you are able to add those. You will provide screenshots to illustrate that you have completed tasks as well as answer questions briefly (in several paragraphs each).

GRADING AND EVALUATION

Your grade in the course will be determined as follows:

- **Online discussions (11)**—33%
- **Written assignments (7)**—42%
- **Final project**—25%

All activities will receive a numerical grade of 0–100. You will receive a score of 0 for any work not submitted. Your final grade in the course will be a letter grade. Letter grade equivalents for numerical grades are as follows:

A	= 93–100	C+	= 78–79
A–	= 90–92	C	= 73–77
B+	= 88–89	C–	= 70–72
B	= 83–87	D	= 60–69
B–	= 80–82	F	= Below 60

To receive credit for the course, you must earn a letter grade of C or better (for an area of study course) or D or better (for a course not in your area of study), based on the weighted average of all assigned course work (e.g., exams, assignments, discussion postings).

STRATEGIES FOR SUCCESS

First Steps to Success

To succeed in this course, take the following first steps:

- Read carefully the entire Syllabus, making sure that all aspects of the course are clear to you and that you have all the materials required for the course.
- Take time to read the entire Online Student Handbook. The Handbook answers many questions about how to proceed through the course and how to get the most from your educational experience at Thomas Edison State University.
- Familiarize yourself with the learning management systems environment—how to navigate it and what the various course areas contain. If you know what to expect as you navigate the course, you can better pace yourself and complete the work on time.
- If you are not familiar with web-based learning, be sure to review the processes for posting responses online and submitting assignments before class begins.

Study Tips

Consider the following study tips for success:

- To stay on track throughout the course, begin each week by consulting the Course Calendar. The Course Calendar provides an overview of the course and indicates due dates for submitting assignments, posting discussions, and submitting the final project.
- Check Announcements regularly for new course information.

Using AI Ethically: A Guide for TESU Students

TESU's Academic Code of Conduct permits student AI use in support of their writing and research process--not as a replacement for original writing. Document AI use with an acknowledgment statement at the end of each assignment, noting the tools and prompts used. Cite any AI-generated content on the References page. Please review Using AI Ethically: A Guide for TESU Students for more detailed information.

COMMITMENT TO DIVERSITY, EQUITY, AND INCLUSION

Thomas Edison State University recognizes, values, and relies upon the diversity of our community. We strive to provide equitable, inclusive learning experiences that embrace our students' backgrounds, identities, experiences, abilities, and expertise.

ACCESSIBILITY AND ACCOMMODATIONS

Thomas Edison State University adheres to the Americans with Disabilities Act (ADA, 1990; ADAAA, 2008) and Section 504 of the Rehabilitation Act of 1973. The Office of Student Accessibility Services (OSAS) oversees requests for academic accommodations related to disabilities; a student who is pregnant, postpartum, or a student parenting a newborn who is not the birth parent [as covered under NJSA18A]; and students requesting academic accommodation for a short-term/temporary illness and/or injury. Information can be found on the Office of Student Accessibility Services webpage and questions can be sent to ADA@tesu.edu.

ACADEMIC POLICIES

To ensure success in all your academic endeavors and coursework at Thomas Edison State University, familiarize yourself with all administrative and academic policies including those related to academic integrity, course late submissions, course extensions, and grading policies.

For more, see:

- University-wide policies
- Undergraduate academic policies
- Undergraduate course policies
- Graduate academic policies
- Graduate course policies
- Nursing student policies

- Nursing graduate student policies
- International student policies
- Academic code of conduct