

ITT Technical Institute
NT1410
Operating Systems
Onsite and Online Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 56 (34 Theory Hours, 22 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisite: NT1110 Computer Structure and Logic or equivalent

Course Description:

This course provides an overview of common operating systems. Topics include architecture, functions, and features of various operating systems.

COURSE DESCRIPTION

This course provides an overview of common operating systems. Topics include architecture, functions, and features of various operating systems.

MAJOR INSTRUCTIONAL AREAS

1. Operating System Responsibilities
2. Processes and Threads
3. Memory Management
4. File System Management
5. I/O Management
6. Mobile and Desktop Operating Systems
7. Updates and Maintenance
8. Security

COURSE LEARNING OBJECTIVES

By the end of this course, you should be able to:

1. Describe what an operating system does.
2. Describe how various operating systems manage applications and processes.
3. Describe how various operating systems manage memory.
4. Describe how files are organized, stored, and accessed.
5. Describe how various operating systems manage input and output.
6. Identify the characteristics of popular operating systems.
7. Compare mobile operating systems to their related desktop operating systems.
8. Configure a development environment to support application development.
9. Manage updates on an operating system.
10. Describe methods used to implement security in an operating system.
11. Explain the virtualization and cloud computing features of modern operating systems.

MODULE 1: OVERVIEW OF OPERATING SYSTEMS

COURSE LEARNING OBJECTIVES COVERED

- Describe what an operating system does.
- Identify the characteristics of popular operating systems.
- Compare mobile operating systems to their related desktop operating systems.

TOPICS COVERED

- Operating Systems: Definition and Role
- Evolution of Operating Systems
- The Place of Operating System in the Modern Computer
- Main Types of Operating Systems
- Functions of Operating Systems

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: <i>Modern Operating Systems</i> , Chapters 1, 10 (pp. 713–722 and pp. 803–807), and 11 (pp. 857–864)	No	9 hrs
Lesson: Study the lesson for this module.	No	1 hr
Discussion: Participate in the discussion titled “Operating Systems for Sophisticated Applications.”	Yes	N/A
Exercise: Submit the exercise titled “Role of Operating Systems.”	Yes	N/A

Total Out-Of-Class Activities: 10 Hours

MODULE 2: PROCESS AND MEMORY MANAGEMENT

COURSE LEARNING OBJECTIVES COVERED

- Describe what an operating system does.
- Describe how various operating systems manage applications and processes.
- Describe how various operating systems manage memory.
- Identify the characteristics of popular operating systems.
- Compare mobile operating systems to their related desktop operating systems.

TOPICS COVERED

- Process and Thread Management
- What, Why, and How of Memory Management
- Memory Abstraction
- Methods of Memory Management
- Virtual and Shared Memory Management
- Process and Memory Management in Unix/Linux/Android and Windows Systems

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: <i>Modern Operating Systems</i> , Chapters 2 (pp. 85–148), 3 (pp. 181–208), 10 (pp. 733–767), and 11 (pp. 908–943)	No	13 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled “Multithreading and Programming.”	Yes	N/A
Exercise 1: Submit the exercise titled “Memory Management.”	Yes	2 hrs
Exercise 2: Submit the exercise titled “Memory and Process Management.”	Yes	4 hrs
Lab: Complete the lab titled “Memory Virtualization and Abstraction.”	Yes	N/A

Total Out-Of-Class Activities: 21 Hours

MODULE 3: FILE AND I/O MANAGEMENT

COURSE LEARNING OBJECTIVES COVERED

- Describe what an operating system does.
- Describe how files are organized, stored, and accessed.
- Describe how various operating systems manage input and output.
- Identify the characteristics of popular operating systems.
- Compare mobile operating systems to their related desktop operating systems.

TOPICS COVERED

- Types of File Systems
- File System Calls
- I/O Devices and Software
- Deadlock Management
- File and I/O Management in Fedora 20/Android and Windows Systems

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: <i>Modern Operating Systems</i> , Chapters 4 (pp. 263–325), 5 (pp. 337–375), 6 (pp. 435–440 and 456–464), 10 (pp. 767–798), and 11 (pp. 943–964)	No	13.5 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Exercise 1: Submit the exercise titled “Comparing File Systems.”	Yes	3 hrs
Exercise 2: Submit the exercise titled “I/O Operations.”	Yes	2 hrs
Lab: Complete the lab titled “Identifying the File System.”	Yes	N/A
Quiz: Prepare for Quiz 1.	No	2 hrs
Quiz: Take Quiz 1.	Yes	N/A

Total Out-Of-Class Activities: 22.5 Hours

MODULE 4: VIRTUALIZATION AND THE CLOUD

COURSE LEARNING OBJECTIVES COVERED

- Describe what an operating system does.
- Explain the virtualization and cloud computing features of modern operating systems.

TOPICS COVERED

- Requirements of Virtualization
- Hypervisors
- Types of Virtualization
- Role of Clouds

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: <i>Modern Operating Systems</i> , Chapter 7	No	4 hrs
Reading: IIT Tech Virtual Library> Basic Search> <ul style="list-style-type: none"> • <i>CLOUD COMPUTING CLAIMS A PIVOTAL ROLE</i> • <i>Adapting grid computing environments dependable with virtual machines: design, implementation, and evaluations</i> • <i>Cloud computing the Glide OS story: solving the cross platform puzzle [electronic resource]</i> • <i>Cloud computing automating the virtualized data center [electronic resource]</i> 	No	5.5 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled “Role of Cloud Computing.”	Yes	1 hr
Exercise 1: Submit the exercise titled “Operating System Installation on Virtual Machine.”	Yes	3 hrs
Exercise 2: Submit the exercise titled “Virtual Machine Design.”	Yes	3 hrs
Lab: Complete the lab titled “Virtual Lab Tour.”	Yes	2 hrs

Total Out-Of-Class Activities: 20.5 Hours

MODULE 5: SECURITY MANAGEMENT

COURSE LEARNING OBJECTIVES COVERED

- Describe what an operating system does.
- Identify the characteristics of popular operating systems.
- Compare mobile operating systems to their related desktop operating systems.
- Describe methods used to implement security in an operating system.

TOPICS COVERED

- Security Environment Threats
- Operating System Security
- Secure Versus Trusted Systems
- Security in Linux/Android and Windows Systems

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: <i>Modern Operating Systems</i> , Chapters 9, 10 (pp. 798–802 and pp. 838–844), and 11 (pp. 966–975)	No	11 hrs
Reading: IIT Tech Virtual Library> Basic Search> <i>Virtualization: Issues, Security Threats, and Solutions</i>	No	3 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled “Secure Systems—A Myth or Reality?”	Yes	1 hr
Exercise 1: Submit the exercise titled “Securing Desktop and Mobile Operating Systems.”	Yes	2 hrs
Exercise 2: Submit the exercise titled “Unix Ownership and Permissions.”	Yes	1 hr
Quiz: Prepare for Quiz 2.	No	2 hrs
Quiz: Take Quiz 2.	Yes	N/A

Total Out-Of-Class Activities: 22 Hours

MODULE 6: APPLICATION DEVELOPMENT FOR POPULAR OPERATING SYSTEMS**COURSE LEARNING OBJECTIVES COVERED**

- Identify the characteristics of popular operating systems.
- Compare mobile operating systems to their related desktop operating systems.
- Configure a development environment to support application development.
- Manage updates on an operating system.

TOPICS COVERED

- IDE Configuration for Application Development
- Operating System Update Management

MODULE LEARNING ACTIVITIES	GRADE D	OUT-OF- CLASS TIME
<p>Reading:</p> <ul style="list-style-type: none"> • Install updates in Windows 7 http://windows.microsoft.com/en-US/windows7/Install-Windows-updates • Update Windows 8 to Windows 8.1 http://windows.microsoft.com/en-us/windows-8/update-from-windows-8-tutorial • Windows Update FAQs http://windows.microsoft.com/en-us/windows-8/windows-update-faq • Windows Phone 8.1 Update hands-on: An insignificant upgrade http://www.pcworld.com/article/2460945/windows-phone-81-update-hands-on-an-insignificant-upgrade.html • Slipstreaming http://www.pcmec.com/article/what-is-slipstreaming/ • Windows critical update utility https://support.microsoft.com/en-us/kb/224420 • Fedora updates 	No	3 hrs

<ul style="list-style-type: none"> • http://fedoraproject.org/wiki/Upgrading_Fedora_using_yum • Fedora Release Life Cycle https://fedoraproject.org/wiki/Fedora_Release_Life_Cycle • Build an Android app http://developer.android.com/training/basics/firstapp/index.html • Build your first Windows 8 app https://msdn.microsoft.com/library/windows/apps/ff402526%28v=vs.105%29.aspx • Why .mobi? http://dotmobi.mobi/ 		
<p>Reading: ITT Tech Virtual Library> Basic Search></p> <ul style="list-style-type: none"> • <i>Adopting DCE technology for developing client/server applications</i> • <i>Windows Phone 8.1 Update hands-on: An insignificant upgrade</i> • <i>Windows XP support ends: Experts explain what users should do next</i> • <i>Is Now the Time to Upgrade Your Operating System and Personal Computer?</i> • <i>INSTALLING THE ANDROID* SDK FOR INTEL® ARCHITECTURE</i> 	No	4 hrs
Lesson: Study the lesson for this module.	No	0.5 hr
Discussion: Participate in the discussion titled “Operating System Updates.”	Yes	2 hrs
Lab: Complete the lab titled “Installing IDE and Updates on Windows 8.1.”	Yes	N/A
Final Exam: Prepare for the final exam.	No	5 hrs
Final Exam: Take the final exam.	Yes	N/A

Total Out-Of-Class Activities: 14.5 Hours

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

CATEGORY	WEIGHT
Discussion	15%
Lab	25%
Exercise	25%
Quiz	10%
Final Exam	25%
TOTAL	100%

GRADE CONVERSION

The final grades will be calculated from the percentages earned in the course, as follows:

GRADE	PERCENTAGE
A (4.0)	90–100%
B+ (3.5)	85–89%
B (3.0)	80–84%
C+ (2.5)	75–79%
C (2.0)	70–74%
D+ (1.5)	65–69%
D (1.0)	60–64%
F (0.0)	<60%

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Tanenbaum, A. (2015). *Modern Operating Systems (4th ed.)*. Upper Saddle River, NJ: Pearson-Prentice Hall.

OTHER ITEMS

- Microsoft Office 2003 or later
- VMware Player or VirtualBox
- Visual Studio 2013
- Prebuilt Fedora 20 Virtual Machine

Note: You can download the Windows 7 files and Visual Studio 2013 from the DreamSpark website. Refer to the [DreamSpark Installation Guide](#) for download instructions. VMware player can be downloaded from www.vmware.com and VirtualBox can be downloaded from www.virtualbox.org.

RECOMMENDED RESOURCES

Periodicals and Journals

- PC World
- PC Magazine
- MacWorld
- Computer Weekly
- Communications of the ACM
- Hewlett-Packard Journal
- Intel Technology Journal

Books

- Carpenter, Tom. (2012). *Microsoft Windows Operating System Essentials*. Hoboken: John Wiley & Sons.

ITT Tech Virtual Library (accessed via Student Portal | <https://studentportal.itt-tech.edu>)

- Basic Search>
 - Leka, D., & Leka, C. (2013). *Cloud computing the Glide OS story: solving the cross platform puzzle*. Cupertino, CA: Happy About.
 - Josyula, V. (2012). *Cloud computing automating the virtualized data center*. Indianapolis, IN: Cisco Press.
 - Emary, I. M. M. E. L., Alyoubi, B. A., & Alyoubi, A. A. ADOPTING REAL TIME OPERATING SYSTEMS FOR VARIOUS APPLICATIONS. *International Journal of Academic Research*, 5 (1), 91-94.
 - Basheer, D. & Albana, S. (2014). Developing an Appliance Real Time Control in Heterogeneous Operating Systems. *International Arab Journal of Information Technology (IAJIT)*, 11 (6), 607-615.
 - Hachman, M. (2014). Windows Phone 8.1 Update hands-on: An insignificant upgrade. *PC World. Sep2014*, 32 (9), 23-26.
 - Lloyd, P., & Horowitz, S. D. (1995). Adopting DCE technology for developing client/server applications. *Hewlett-Packard Journal*, 46 (6), 16.
 - McDonald, C. (2014). Windows XP support ends: Experts explain what users should do next. *Computer Weekly*, 4-5.
 - Weber, R. M., & Horn, B. D. (2014). Is Now the Time to Upgrade Your Operating System and Personal Computer? *Journal of Financial Service Professionals*, 68 (4), 29-32.
 - Cohen, R. (2014). INSTALLING THE ANDROID* SDK FOR INTEL® ARCHITECTURE. *Intel Technology Journal*, 18 (2), 72-84.
 - Hoffman, C. (2014). Linux to the rescue: How Ubuntu can help a computer in distress. *PC World*, 32 (7), 117-124.
 - Madhavapeddy, A., & SCOTT, D. J. (2014). Unikernels: The Rise of the Virtual Library Operating System. *Communications of the ACM*, 57 (1), 61-69.
 - Junfeng, Y., Heming C., Jingyue W., Gang H., & Yang T. (2014). Making Parallel Programs Reliable with Stable Multithreading. *Communications of the ACM*, 57 (3), 58-69.

- Gregg, B. (2013). Thinking Methodically about Performance. *Communications of the ACM*, 56 (2), 45-51.
- Ott, D. (2014). ANDROID* SECURITY: ISSUES AND FUTURE DIRECTIONS. *Intel Technology Journal*, 18 (2), 34-49.

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course uses several teaching strategies. This course aims to help first-time learners understand how operating systems work and the impact that a given operating system will have on the applications and devices it services. Therefore, exercises have been planned to help you explore operating systems theory as well as the different models employed by subsystems that include process and thread management, memory management, and file system management. Discussion forums have been designed to enable you to learn collaboratively and demonstrate understanding of the subject over and above the theoretical knowledge explored through the exercises. The labs provide the required hands-on exploration of common modern operating systems such as Microsoft Windows, Linux, Android, and Windows Phone. Your progress will be regularly assessed through a variety of assessment tools including discussions, labs, exercises, quizzes, and a final exam.

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a “time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education,

ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

Instructor Name	
Office Hours	
Contact Details	

(End of Syllabus)