

ITT Technical Institute
SD1430
Introduction to Mobile Operating
Systems
Onsite Course

SYLLABUS

Credit hours: 4.5

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

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

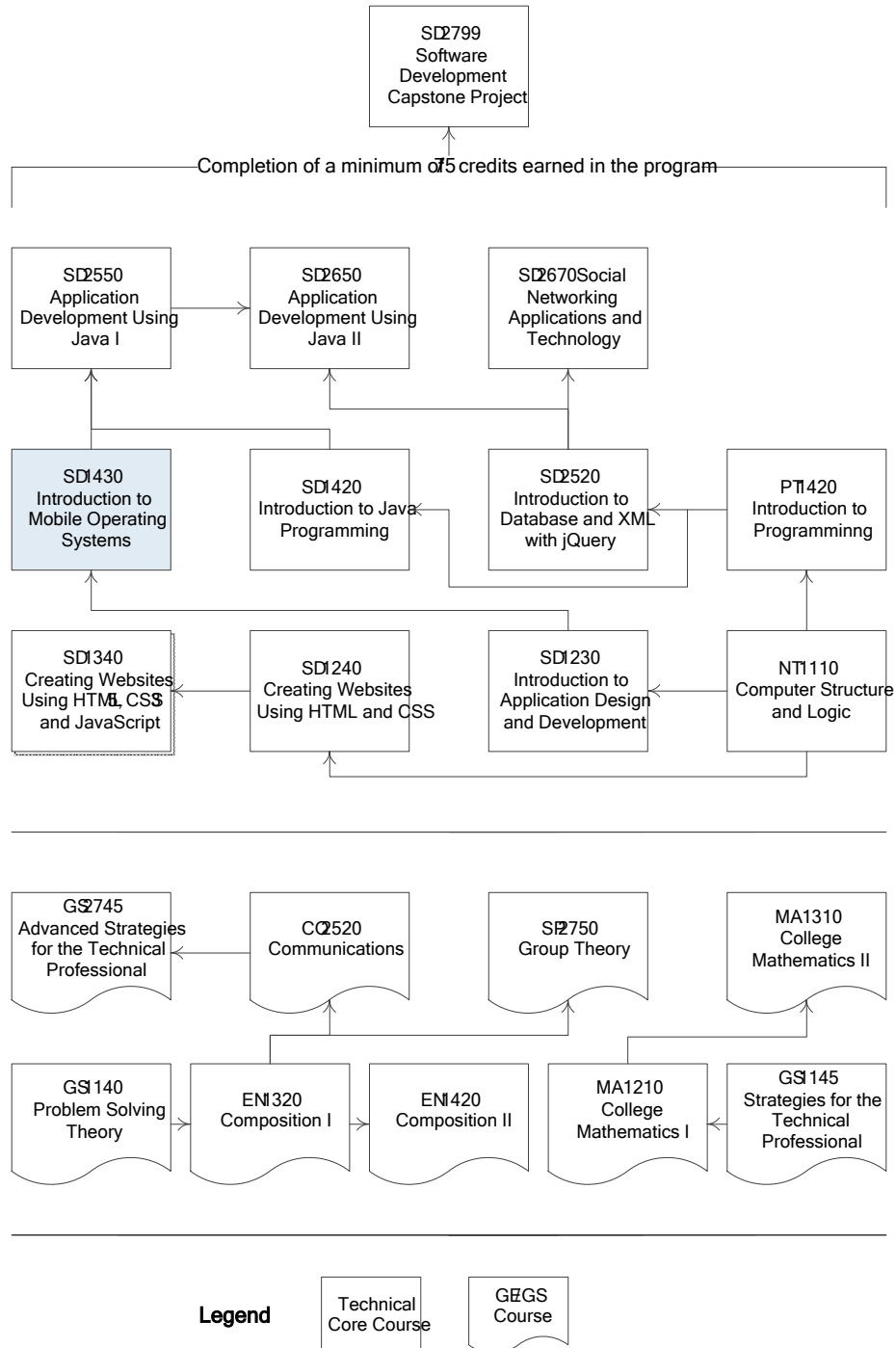
Prerequisite: SD1230 Introduction to Application Design and Development or equivalent

Course Description:

This course provides an overview of mobile operating systems, such as iOS, Android and Windows Mobile. Topics include architecture, functions and the impact on application development in each operating system

Where Does This Course Belong?

The following diagram demonstrates how this course fits in the standard program:



Program Information

Program Scope and Core Content Areas

This program exposes students to a variety of fundamental skills used in entry-level software development, software analysis, and application design positions. Students will be exposed to various aspects of programming, databases, website design, and the development of a software product.

Program Goals and Objectives

Upon the completion of the program, the student is expected to:

- Apply programming logic and algorithmic thinking to software development solutions
- Develop fluency in applying programming and development tools and platforms
- Evaluate and apply appropriate software development theories, methods, and tools for solving specific problems
- Design, develop, test, and maintain software applications, databases, and systems to meet business and user requirements

Career Impact

This program offers graduates an opportunity to develop knowledge and skills that they can use to help them pursue careers in a variety of entry-level programming, application design, and software development positions, such as Web developer, systems analyst, database programmer, or testing analyst.

NOTE: Refer to the catalog for the state-specific course and program information, if applicable.

This course is required for the Associate Degree in Software Development. This program covers the following core areas:

- IT Foundation
- Software Development and Design Foundation
- Database Foundation
- Platform-Specific Programming
- Technology Applications Environment
- General Education

Course Summary

Major Instructional Areas

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

Course Objectives

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

Learning Materials and References

Required Resources

Complete Textbook Package	New to This Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
Sobell, M., Gargenta, M., Wildermuth, S., Pogue, D., Smyth, N., Levin, J., Dubey, A., & Misra, A. (2014). <i>Introduction to mobile operating systems</i> (Custom Edition). Boston, MA: Pearson Custom			
McIver McHoes, A., & Ballew, J. (2012). <i>Operating systems demystified</i> . Columbus, OH: McGraw-Hill Education			
Reese, R. (2014). <i>Introduction to mobile operating systems student lab manual</i> . Boston, MA: Pearson Custom			
Sobell, M. (2014). <i>Introduction to mobile operating systems student DVD</i> . Boston, MA: Pearson Custom			
Other Items	New to This Course	Carried over from Previous Course(s)	Required for Subsequent Course(s)
USB external hard disk			
ITT-Lab (Android) virtual machine			
VMware Player 5.01 (or later)			

Recommended Resources

Books and Professional Journals

- Smart Developer

<http://www.smart-developer.com/Magazine>

- Smashing Magazine

<http://mobile.smashingmagazine.com/>

- Software Developer's Journal

<http://sdjournal.org>

Professional Associations

- Apple Developer

<https://developer.apple.com/>

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

- Home page > Books > Books 24x7:
 - Allen, G. (2012). *Beginning Android 4*. New York, NY: Apress.
 - Baxter-Reynolds, M. (2010). *Multimobile development: Building applications for the iPhone and Android platforms*. New York, NY: Apress.
 - Campagna, R., Iyer, S., & Krishnan, A. (2011). *Mobile device security for dummies*. Hoboken, NJ: John Wiley & Sons.
 - Gruman, G. (2012). *OS X Mountain Lion bible*. Hoboken, NJ: John Wiley & Sons.
 - Jackson, W. (2012). *Android apps for absolute beginners* (2nd ed.). New York, NY: Apress.
 - Lee, H., & Chuvyrov, E. (2012). *Beginning Windows Phone app development*. New York, NY: Apress.
 - Miller, C., Blazakis, D., Dai Zovi, D., Esser, S., Iozzo, V., & Weinmann, R.P. (2012). *iOS hacker's handbook*. Hoboken, NJ: John Wiley & Sons.
 - Reddy, C. M. (2009). *Operating systems made easy*. New Delhi: Laxmi Publications.
 - Shotts, W. E. (2012). *The Linux command line: A complete introduction*. San Francisco, CA: No Starch Press.
 - Thomas, K. (2006). *Beginning Ubuntu Linux: From novice to professional*. New York, NY: Apress.

Other References

- Android

<http://www.android.com>

- Apple

<http://www.apple.com>

- DLL XP Information

<http://xpdll.nirsoft.net/>

- Microsoft

<http://www.microsoft.com>

- Microsoft Developer Network

<http://msdn.microsoft.com>

- Ubuntu Linux

<http://www.ubuntu.com>

NOTE: All links are subject to change without prior notice.

Information Search

Use the following keywords to search for additional online resources that you may use to support your work on the course assignments:

- Operating system
- Mobile operating system
- Windows Phone
- Android
- iOS
- OS X
- Linux
- Windows 8
- Memory management
- Application process
- Threads
- Data storage
- I/O
- Mobile security

Suggested Learning Approach

In this course, you will be studying individually and within a group of your peers. As you work on the course deliverables, you are encouraged to share ideas with your peers and instructor, work collaboratively on projects and team assignments, raise critical questions, and provide constructive feedback.

Use the following advice to receive maximum learning benefits from your participation in this course:

DO	DON'T
<ul style="list-style-type: none"> ▪ Do take a proactive learning approach ▪ Do share your thoughts on critical issues and potential problem solutions ▪ Do plan your course work in advance ▪ Do explore a variety of learning resources in addition to the textbook ▪ Do offer relevant examples from your experience ▪ Do make an effort to understand different points of view ▪ Do connect concepts explored in this course to real-life professional situations and your own experiences 	<ul style="list-style-type: none"> ▪ Don't assume there is only one correct answer to a question ▪ Don't be afraid to share your perspective on the issues analyzed in the course ▪ Don't be negative about the points of view that are different from yours ▪ Don't underestimate the impact of collaboration on your learning ▪ Don't limit your course experience to reading the textbook ▪ Don't postpone your work on the course deliverables – work on small assignment components every day

Instructional Methods

The curriculum is designed to encourage a variety of teaching strategies that support the course objectives while fostering higher cognitive skills. This course will employ multiple methods to deliver content and inspire and engage you, including lectures, collaborative learning options, and hands-on activities. This course is composed of theory and lab components. Your progress will be regularly assessed through weekly assignments, labs, and a final exam.

Out-of-Class Work

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.

Unit 1: INTRODUCTION TO OPERATING SYSTEMS

Upon completion of this unit, students are expected to:

- Describe how an operating system provides an interface between applications and hardware.
- Describe how an operating system manages applications.
- Describe how an operating system manages resources.
- Configure ITT-Lab.
- Describe the evolution of desktop and mobile operating systems.
- Describe the characteristics of client/server computing.
- Describe the characteristics of cloud computing.
- Describe the boot process of various operating systems.

**Total
outside
work:**
5 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Mclver McHoes and Ballew	Chapter 1: Quick Overview	pp. 1–26	26
Mclver McHoes and Ballew	Chapter 2: Understanding the Boot Process	pp. 27-51	24	
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			2 hr
	Complete Unit 1 Assignment 1: Research Desktop Operating Systems			1.5 hr
	Complete Unit 1 Assignment 2: What Makes Mobile Different?			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 1 Assignment 1: Research Desktop Operating Systems		2%
		Unit 1 Assignment 2: What Makes Mobile Different?		2%
	Lab	Unit 1 Lab 1: Configure ITT-Lab		1%
		Unit 1 Lab 2: Explore the Windows Operating System		2%

Unit 2: LINUX AND ANDROID				
Upon completion of this unit, students are expected to:				Total outside work: 6 hours
<ul style="list-style-type: none"> Identify the characteristics of the Android operating system. Identify differences and similarities between Android and Linux. Install Ubuntu and the Android SDK on a development computer. 				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Sobell	Chapter 3: Step-by-Step Installation	pp. 51–63	12
	Sobell	Chapter 4: Introduction to Ubuntu Linux	pp. 97–157	60
	Gargenta	Chapter 1: Android Overview		6
	Gargenta	Chapter 2: The Stack		6
	Gargenta	Chapter 3: Quick Start		10
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			4.5 hr
	Complete Unit 2 Assignment 1: Research Jellybean			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 2 Assignment 1: Research Jellybean		3%
	Lab	Unit 2 Lab 1: Create an Ubuntu Virtual Machine		2%

Unit 3: WINDOWS AND WINDOWS PHONE				
Upon completion of this unit, students are expected to:				
<ul style="list-style-type: none"> Identify the characteristics of Windows Phone. Identify differences and similarities between Windows 8 and Windows Phone 8. Describe the development environment required to create Windows Phone 8 applications. Use XAML and C# to create a Windows application. Explore the Ubuntu desktop. 				Total outside work: 4.5 hours
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Wildermuth	Chapter 1: Introducing Windows Phone		26
	Wildermuth	Chapter 2: Writing Your First Phone Application		39
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			3 hr
	Complete Unit 3 Assignment 1: Compare Windows 8 and Windows RT			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 3 Assignment 1: Compare Windows 8 and Windows RT		3%
	Lab	Unit 3 Lab 1: Explore the Ubuntu Desktop		2%
		Unit 3 Lab 2: Use XAML to Create a Windows Application		2%
	Unit 3 Lab 3: Explore Windows Phone App Distribution		1%	

Unit 4: MAC OS X AND iOS

Upon completion of this unit, students are expected to:

- Install Ubuntu and the Android SDK on a development computer.
- Describe how to improve the performance and efficiency of mobile operating systems.
- Identify the characteristics of iOS.
- Identify differences and similarities between Mac OS X and iOS.
- Describe the development environment required to create iOS applications.

**Total
outside
work:**
7.5 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Pogue (<i>Switching to the Mac</i>)	Introduction	pp. 1–6 and 9–15	12
	Pogue (<i>Switching to the Mac</i>)	Chapter 1: How the Mac is Different		27
	Pogue (<i>iPhone</i>)	Chapter 1: The Guided Tour		22
	Smyth	Chapter 1: Start Here		3
	Smyth	Chapter 2: Joining the Apple iOS Developer Program		4
	Smyth	Chapter 3: Installing Xcode 4 and the iOS 6 SDK		2
	Levin	Chapter 1: Darwinism: The Evolution of OS X		14
	Levin	Chapter 2: E. Pluribus Unum: Architecture of OS X and iOS		37
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			6 hr
	Complete Unit 4 Assignment 1: Research iOS App Development			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 4 Assignment 1: Research iOS App Development		3%
	Lab	Unit 4 Lab 1: Install the Android SDK		2%
		Unit 4 Lab 2: Research OS X and iOS		2%

Unit 5: PROCESSES AND THREADS				
Upon completion of this unit, students are expected to:				Total outside work: 8 hours
<ul style="list-style-type: none"> • Describe multiprocessing strategies. • Describe multi-threading strategies. • Explain how the Android operating system manages multiple processes. • Explain how iOS manages multiple processes. • Explain how Windows Phone 8 manages multiple processes. 				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Mclver McHoes and Ballew	Chapter 3: Process and Thread Management	pp. 55–73	19
	Mclver McHoes and Ballew	Chapter 4: CPU Management	pp. 77–98	22
	Mclver McHoes and Ballew	Chapter 5: CPU Scheduling and Deadlocks	pp. 101–118	18
	Gargenta	Chapter 4: The Main Building Blocks		9
	Gargenta	Chapter 6: Android User Interface	pp. 65–69	5
	Levin	Chapter 4: Parts of the Process; Mach-O Process and Thread Internals	pp. 91–95 and 143–146	9
	Smyth	Chapter 55: An Overview of iOS 6 iPhone Multitasking		10
Wildermuth	Chapter 10: Multitasking		36	
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			6.5 hr
	Complete Unit 5 Assignment 1: Compare Multitasking Strategies			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 5 Assignment 1: Compare Multitasking Strategies		4%
	Lab	Unit 5 Lab 1: Explore Process Management on Windows		2%
		Unit 5 Lab 2: Explore Process Management on Linux		1%
		Unit 5 Lab 3: Explore Process Management on Android		1%

Unit 6: MEMORY MANAGEMENT				
Upon completion of this unit, students are expected to:				Total outside work: 5.5 hours
<ul style="list-style-type: none"> Describe how an operating system associates memory with a process. Explain how the Android operating system manages memory. Explain how iOS manages memory. Explain how Windows Phone 8 manages memory. 				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Mclver McHoes and Ballew	Chapter 6: Managing Main Memory	pp. 123–140	18
	Mclver McHoes and Ballew	Chapter 7: Virtual Memory Management	pp. 143–161	19
	Levin	Chapter 4: Parts of the Process: Mach-O, Process, and Thread Internals	pp. 130–133	4
	Levin	Chapter 12: Commit to Memory: Mach Virtual Memory		44
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			4 hr
	Complete Unit 6 Assignment 1: Research Memory Management on iOS, Android, and Windows Phone			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 6 Assignment 1: Research Memory Management on iOS, Android, and Windows Phone		4%
	Lab	Unit 6 Lab 1: Explore Memory Management on Windows		2%
		Unit 6 Lab 2: Explore Memory Management on Linux		1%
Unit 6 Lab 3: Explore Memory Management on Android		1%		

Unit 7: I/O MANAGEMENT				
Upon completion of this unit, students are expected to: <ul style="list-style-type: none"> • Describe input and output methods used by mobile operating systems. • Describe how data is written to a storage device. • Describe the storage devices supported by mobile devices. 				Total outside work: 6 hours
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Mclver McHoes and Ballew	Chapter 8: Managing System Devices		20
	Wildermuth	Chapter 7: Phone Hardware		57
	Gargenta	Chapter 11: Broadcast Receivers		13
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			4.5 hr
	Complete Unit 7 Assignment 1: Research iOS 7 Framework Improvements			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 7 Assignment 1: Research iOS 7 Framework Improvements		3%
	Lab	Unit 7 Lab 1: Research I/O Methods Supported by Android		3%

Unit 8: FILE SYSTEM MANAGEMENT				
Upon completion of this unit, students are expected to:				Total outside work: 6.5 hours
<ul style="list-style-type: none"> Describe the role of a file system. Identify the characteristics of the file systems supported by Android. Identify the characteristics of the file systems supported by iOS. Identify the characteristics of the file systems supported by Windows Phone 8. 				
READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Mclver McHoes and Ballew	Chapter 9: File System Management	pp. 189-210	21
	Wildermuth	Chapter 9: Databases and Storage	pp. 389-401	13
	Gargenta	Chapter 7: Preferences, the File System, the Options Menu, and Intents	pp. 95-99	5
	Smyth	Chapter 31: Working with Directories on iOS 6	pp. 231-238	9
	Smyth	Chapter 32: Working with iPhone Files on iOS 6	pp. 239-246	7
	Levin	Chapter 15: Fee, Fi-Fo, File: File Systems and the VFS	pp. 565-583	19
	Levin	Chapter 16: To B (-Tree) or Not to Be—the HFS+ File Systems	pp. 607-623	17
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			5 hr
	Complete Unit 8 Assignment 1: Comparing File Systems			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 8 Assignment 1: Comparing File Systems		4%
	Lab	Unit 8 Lab 1: Explore Linux and Android File Systems		3%

Unit 9: NETWORKING, TELEPHONY, AND MESSAGING

Upon completion of this unit, students are expected to:

- Describe how data is stored and accessed in cloud storage.
- Describe personal area networks.
- Describe wireless and wired networking.
- Describe 3G and 4G broadband networking.
- Identify key protocols in the TCP/IP suite.
- Describe IP addressing concepts.

**Total
outside
work:**
9 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
	Mclver McHoes and Ballew	Chapter 10: Introduction to Networking	pp. 213–237	27
	Pogue (<i>iPhone</i>)	Chapter 10: Getting Online		13
	Wildermuth	Chapter 11: Services		61
OUT-OF-CLASS WORK	Activity			Estimated Time
	Complete the reading assignment			6 hr
	Complete Unit 9 Assignment 1: Research Cloud Storage			1.5 hr
	Complete Unit 9 Assignment 2: Research Mobile Device File Transfer Methods			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 9 Assignment 1: Research Cloud Storage		2%
		Unit 9 Assignment 2: Research Mobile Device File Transfer Methods		1%
	Lab	Unit 9 Lab 1: Manage Network Settings on Linux		2%
		Unit 9 Lab 2: Manage Network Settings on Android		2%

Unit 10: SECURITY

Upon completion of this unit, students are expected to:

- Describe authentication and authorization.
- Describe encryption.
- Describe local wipe and remote wipe.
- Describe how geolocation may encounter security issues on mobile devices.
- Manage updates on an Android device.
- Manage updates on an iOS device.
- Manage updates on a Windows Phone 8 device.
- Describe the pros and cons of updating on various mobile operating systems.

**Total
outside
work:**
10.5 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
		Dubey and Misra	Chapter 4: Android (in) Security	
	Dubey and Misra	Chapter 9: Securing Android for the Enterprise Environment		28
OUT-OF-CLASS WORK	Activity			Estimated Time
	Study for Final Exam			5 hr
	Complete the reading assignment			2.5 hr
	Complete Unit 10 Assignment 1: Research iOS and Windows Phone 8 Security			1.5 hr
	Complete Unit 10 Assignment 2: To Root or Not to Root?			1.5 hr
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Assignment	Unit 10 Assignment 1: Research iOS and Windows Phone 8 Security		2%
		Unit 10 Assignment 2: To Root or Not to Root?		2%
	Lab	Unit 10 Lab 1: Manage Android Security Settings		3%

Unit 11: REVIEW AND FINAL EXAM

Upon completion of this unit, students are expected to:

- Demonstrate mastery of course content through completion of questions on the final exam.

**Total
outside
work:**
0 hours

READING ASSIGNMENT	Author	Chapter/Title	Pages (if necessary)	Total Pages
		None		
OUT-OF-CLASS WORK	Activity			Estimated Time
	None			
GRADED ACTIVITIES/ DELIVERABLES	Grading Category	Activity/Deliverable Title		Grade Allocation (% of all graded work)
	Exam	Final Exam		30%

Note: Your instructor may add a few learning activities that are ungraded.

Evaluation and Grading

Evaluation Criteria

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

Category	In-Class	Out-of-Class	Weight
Assignment	0%	35%	35%
Lab	35%	0%	35%
Exam	30%	0%	30%
TOTAL	65%	35%	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%

Academic Integrity

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct, including plagiarism, self-plagiarism, fabrication, deception, cheating, and sabotage. For more information on the academic honesty policies, refer to the Student Handbook and the Course Catalog.

(End of Syllabus)