DIGITAL FORENSICS
INFORMATION ASSURANCE

COURSE SYLLABUS
DFIA 261- Intro to Linux
CRN: 2876-3 CR HRS.

Instructor:	Prof. Josh Brunty	**Class Meets:**	MWF 10:00-10:50AM
Office:	WAEC 2001	**Classroom:**	WAEC 1232
Phone:	304-696-5602	**Office Hours:**	MWF 9:00-10:00AM
Email:	josh.brunty@marshall.edu		TR 9:30-11:00AM

Course Description (from catalog):

An introductory course for the Linux operating system, focusing on its application in information assurance and the digital forensics.

More Description:

This three (3) credit hour Intro to Linux course (CRN #2876), through lecture, demonstration, and practical "hands-on" training, is designed for people who are new to Linux and who want to develop a good working knowledge of the operating system using both the command-line and graphical user interface. You will explore the same tools and practice techniques used by Linux end users and system administrators every day. Areas of instruction include Linux software and hardware, the boot process, file and filesystem management, disk management, and working with text files. After completing this course, you should be able to competently work with any major Linux distribution.

Course Format:

This Intro to Linux course will meet every MWF from 10:00am-10:50am in the Weisberg Applied Engineering Complex (WAEC) Room 1232 (Digital Forensics Laboratory).

Students will be given lecture and multiple in-class, instructor-led lab exercises that focus on a variety of Linux methodologies. Students will also complete sixteen (16) hands-on, out-of-class, end of module laboratory exercises throughout the course of the semester. Students will also be quizzed on content at multiple points during the semester.

A midterm and final examination will also be given in the course.

Required Texts, Additional Reading, & Other Materials:

- Required Text:
  - Blum, Rich and Jesse Varsalone**, *Linux Fundamentals: National CyberWatch Edition*,** 1st edition, Burlington, MA: Jones & Bartlett, 2016, Print ISBN: 9781284108057, 1284108058 eText ISBN: 9781284108057.

- You will also be required to purchase a lab from either the Marshall University Bookstore or you can purchase a lab code directly from the INFOSECLEARNING lab provider in order to

complete the virtual Linux laboratory exercises within course. These Linux virtual machines & labs are entirely HTML5-based and require no plugins to run. These labs can be completed from anywhere. Google Chrome is the supported browser for this lab-based environment. The Course ID for this lab course is: MEFNLGCZBK.

- Students will need to create Tophat user account and purchase a Tophat subscription plan for use within this course. Tophat can either be purchased online or through MU Bookstore with different subscription options based upon your needs. Subscription plans vary from 4 month access, semester access, to lifetime access. However, if you are a full-time student in the DFIA program I would recommend that you purchase the lifetime subscription as this software will be used in your future DFIA coursework. Tophat will be used to track attendance, class quizzes, reviews, etc. The join code for this course is 823162 and the course homepage is https://app.tophat.com/e/823162 Tophat can be used from either a PC or via the Android/iOS app on a mobile device. Students can also text-in answers to +1 (315) 636-0905 via SMS. This is ideal for poor wifi or older mobile devices.

- Assigned readings and laboratory exercises are an essential component of this course and provide students with a baseline of knowledge that will be expanded upon through more detailed and complex in-class lectures and discussions. Students will be required to complete assigned readings prior to the class period in which the material will be discussed. Labs are due at Fridays at 11:59PM on the due date specified in the course schedule below.

- Supplemental course materials (e.g., handouts, reading assignments, lab exercises, etc.) will be posted to the Blackboard/MUOnline: http://www.marshall.edu/muonline

Desired Objectives/Outcomes:

This course is designed to focus on 5 major instructional areas pertaining to Linux: 1) The basics of the Linux operating system, 2) Linux software and hardware 3) The Linux boot process and filesystem 4) Command-line basics and file management and 5) Linux system administration. The course also places heavy focus and emphasis on working with Linux in digital forensics and information assurance. This foundational knowledge will help further understanding in future courses you will take in digital forensics & information assurance.

In this course, learning outcomes are gauged as followed:

Course Student Learning Outcome	How Practiced in This Class	How Assessed in This Course
Examine the components of the Linux operating system and major Linux distributions.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.
Describe Linux desktop and server applications, package management, and installation procedures.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.

Explain the Linux boot process, boot loaders, and process initialization.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.
Describe Linux filesystems and disk management techniques.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.
Describe the Linux command line interface (CLI) and use of shell commands.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.
Explain how Linux handles files and directories, and various file management techniques.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.
Describe ways to sort, search, and manipulate text files.	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.
Describe general and advanced Linux system administration techniques, including processes, networking, services, user accounts, file permissions, printers, and logging. Including application in digital forensics and information assurance	In-class lecture & hands on laboratory exercises.	Classroom Discussion, In-Class Lecture & Labs, In-Class & Out-of-Class Laboratory Exercises, midterm exam, final exam.

University Policies:

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/policies/

Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

Attendance Policy and Make-up Work:

Regular attendance in this class is crucial to your success as a student. The only way to benefit from class discussions and hands-on learning activities is to be here. Being present and on time for all class meetings is expected. Period. Excused absences include: 1) University-sponsored academic activities (performing arts, debate and individual events, honors classes, ROTC); official athletic events; other university activities (student government). 2) Student Illness or Critical Illness/Death in the Immediate Family:" Immediate Family" is defined as a spouse/life partner, child, parent, legal guardian, sibling, grandparent or grand- child. *Routine doctor appointments are not excused. Appointments should be scheduled around your classes. 3) Short-Term Military Obligation. 4) Jury Duty or Subpoena for Court Appearance and 5) Religious Holidays. It is the student's responsibility to provide appropriate documentation to Dean of Student Affairs or the instruction for excused absence. Learn how the process works here: http://www.marshall.edu/student-affairs/excused-absence-form/ The student should also request opportunity to complete missed work immediately upon return to class. Be aware that excessive absences—whether excused or unexcused—may affect your ability to earn a passing grade. Regardless of the nature of the excused absence, you are responsible for completing all coursework prior to the end of the semester.

Because this course is an interactive class, students who miss class due to University-excused activities will be provided with an alternative assignment that connects to the activities in the missed class session. For unexcused absences, if you miss ***two (2)*** classes, I will issue a warning. If you miss a **third (3rd)** class: You will receive an automatic **one letter grade deduction** in the course. We will conference to discuss your standing and develop a plan of improvement. If you meet its criteria, you may have the chance to earn back the letter grade deduction. If you miss a fourth class, the previous letter grade deduction stands, regardless of improvement plan results. Subsequent missed classes will result in an additional letter grade deduction for each absence. Regardless, students will earn 1 point for each class attended and 1 point for each in-class quiz taken. The points for these can **ONLY** be made up if an excused absence is provided.

Assignment Submission & Late Policy:

The course includes 16 practical labs that must be completed during the course. NO LATE LABS WILL BE ACCEPTED. Please do not procrastinate in working on your labs or as many others have done in the past as you will most likely fail the course. I would recommend allotting 90 minutes per lab to complete all the steps required (although some may take less time depending on your comfort and skill level). You can complete these labs anytime you wish and as many times as you wish before the due date, however, points cannot be earned after the weekly due date cutoff.

Course Requirements & Grading Policy:

Lab and exam grades will be posted as soon as graded to the student and can be viewed via MUOnline. Should you wish to appeal a grade, test question, etc, you need to follow this procedure. You should send an email via MUOnline to the Graduate Assistant and CC me. The title of the email must read "GRADE APPEAL – Assignment Name" (i.e. Lab 1, Exam 1, etc). The body of the email must include the question, question number, your answer, and why you think you deserve credit. For tests and quizzes in MUOnline, this should be done immediately after completion, before you leave class. You can copy and paste this information to make

things simple. I will get back to you as soon as possible.

Students will be evaluated in this course based on their performance in the following weighted-percentage categories:

Top Hat Attendance & In-Class Quizzes (25%)- Attendance will be taken each day of class via Top Hat. It is the student's responsibility to make sure that attendance is properly recorded for that class Each class will be worth 1 point and will be calculated as a composite score at the end of the semester. Any in-class quizzes given by the instructor via Top Hat will also earn 1 point for participation for each quiz completed. This will also factor into this weighted percentage calculation.

Linux Virtual Labs (25%) – There are 16 practical-based labs due Fridays @ 11:59PM beginning in week 2. The due dates for these labs can be found both in Blackboard and the schedule below. The composite completion grade of these labs will factor into this lab percentage. Each lab is worth 50 points.

Midterm Exam- (25%)

Final Exam- (25%)

Attendance/In-Class Quizzes	25%
Linux In-Class Labs (16 Total)	25%
Midterm Examination	25%
Final Examination	25%
Total	**100%**

Evaluation Category	Your Score (Out of 100)	Weight	Contribution to Final Grade
Attendance/Quizzes (average)		X .25 =	
Linux In-Class Labs (16 Total Labs @ 50pts each. 800 pts)		X .25 =	
Midterm Exam		X .25 =	
Final Exam		X .25 =	
Final letter grades are calculated using the following scale: 90-100 A 80-89 B 70-79 C 60-69 D Below 60 F		**Final Grade (out of 100)**	

This class will employ a weighted grading system. To determine your grade in this course, fill in your percentage score for each evaluation category below, first calculate your score out of 100. (for example, a lab grade of 775/800 would calculate to 97%), multiply that value out of 100 by its weight, and then add the values in the final grade column to find your overall grade out of 100. I will post grades for individual assignments and exams on blackboard. However, please remember that you **must** use the weighted grading system shown below to determine an accurate portrayal of your overall course grade. I am happy to meet with you to discuss your course progress/grade during office hours throughout the semester.

Because there will be a number of out-of-class labs and hands-on assignments as part of this course. As such, you will be given card access to the Digital Forensics Laboratory (WAEC 1232) to work on assignments and practice labs when classes aren't in session. Open lab schedules will be posted during the first or second week of classes. If you do not have an RFID-enabled access card you can obtain your first one free-of-charge from the campus ID office located on the first floor of Drinko Library. In addition, you will also need to complete the required COS IT Conduct form before the end of the first week of classes online by visiting http://www.marshall.edu/cosweb/agreements/?a=j3qw3 Usage of the computers and course files will not be permitted until the online form is completed.

Communication:

I will post course content on MUOnline (e.g., syllabus, assignments, readings, etc.), so be sure to check for new materials regularly. Your MU e-mail address will be used to make any general announcements, last minute schedule changes, etc. I recommend that you monitor your MU

email and MUOnline accounts at least once a day. Also, I will only respond to emails that you send me from your official MU email address – it is the only way for me to be sure that I am responding to you (and not someone else pretending to be you).

If you need to schedule an office-hours appointment with me (career guidance, help with lab projects, etc.) you can stop by during my office hours or you can schedule an appointment with me anytime by visiting: https://calendly.com/joshbrunty/studentmeeting

Classroom Learning Environment:

To foster the best possible environment for learning, we will follow "Brunty's Maxims" They are as follows:

- ✓ *Don't Lie…*
- ✓ *Don't Cheat…*
- ✓ *Don't Steal…*
- ✓ *Don't play on your cellphone unless directed to do so.*
- ✓ *Don't have conversations that distract the class.*
- ✓ *Don't disparage other students- Treat everyone with respect.*
- ✓ *Don't be late for class*
- ✓ *ALWAYS be professional. Take advantage of your time here. Ask questions. Participate.*

Students who violate these maxims will be asked to leave class.

Course Schedule and Due Dates:

NOTE: This is a tentative schedule and it may change as the class progresses and/or classes are cancelled. Lab Projects, etc. are listed in the notes section. Virtual Labs must also be completed by 11:59PM as they appear on the schedule below.

Module 1: Linux Basics (1/8-1/12)	
Required Readings	Chapter 1: Linux Basics
Lab	No Lab Due
Module 2: Linux Software: Common Applications (1/15-1/19)	
Required Readings	Chapter 2: Linux and Software ▪ Through the "Installing Applications in the Linux Desktop Environment" section
Lab(s)	Lab #1- CentOS Server Linux Installation Lab #2- Ubuntu Desktop Linux Installation
Note:	No Class 1/15 (MLK Day)
Module 3: Linux Software: Management (1/22-1/26)	
Required Readings	Chapter 2: Linux and Software From the "Features for Handling Software Management" section to the end of the chapter
Lab	Lab #3- Installing Packages and Shared Libraries on Fedora and Ubuntu

Module 4: Linux and Hardware (1/29-2/2)	
Required Readings	Chapter 3: Linux and Hardware
Lab	Lab #4- Displaying Hardware
Module 5: Booting Linux (2/5/2/9)	
Required Readings	Chapter 4: Booting Linux
Lab	Lab #5- Booting & Restarting the System
Module 6: Making File Systems (2/12-2/16)	
Required Readings	Chapter 5: Making File Systems
Lab	No Lab Due
Midterm Exam Week (2/19-2/23)	
Midterm Exam	Exam Covers Modules 1-6
Lab	Lab #6- Adding a New Partition Lab #7- Managing Filesystem Quotas
Note:	No Class 2/21 & 2/23 (AAFS Meeting)
Module 7: Command Line Basics: The Shell (2/26-3/2)	
Required Readings	Chapter 6: Command Line Basics Through the "Shell Basics" section
Lab	No Lab Due
Module 8: Command Line Basics: Redirection and Variables (3/5-3/9)	
Required Readings	Chapter 6: Command Line Basics From the "Redirecting Input and Output" section to the end of the chapter
Lab	No Lab Due
Module 9: File Management: Filesystems and Directories (3/12-3/16)	
Required Readings	Chapter 7: File Management Through the "Directory Handling" section
Lab	No Lab Due
Spring Break (3/19-3/23)- No Class	
Module 10: File Management: File Handling (3/26-3/30)	
Required Readings	Chapter 7: File Management From the "File Handling" section to the end of the chapter
Lab	Lab #8- Using the BASH Shell #1 Lab #9- Using the BASH Shell #2 Lab #10- Using the BASH Shell #3

Module 11: Working with Text Files: Editing and Searching (4/2-4/6)	
Required Readings	Chapter 8: Working with Text Files Through the " Using Regular Expressions" section
Lab	Lab #11- Using the BASH Shell #4
Module 12: Working with Text Files: Shell Scripts and SQL Files (4/9-4/13)	
Required Readings	Chapter 8: Working with Text Files From the "Running Shell Scripts" section to the end of the chapter
Lab	No Lab Due
Module 13: System Administration (4/16-4/20)	
Required Readings	Chapter 9: System Administration
Lab	Lab #12- Managing Text Files 1 Lab #13- Managing Text Files 2 Lab #14- Managing Text Files 3
Module 14: Advanced Administration (4/23-4/27)	
Required Readings	Chapter 10: Advanced Administration Through the "Email Administration" section
Lab	Lab #15- Working with Files Lab #16: Monitoring Processes
Final Exam Week (4/30-5/4)	
Final Exam	Exam Covers Modules 7-14 Exam Time: Monday 4/30 10:15AM-12:15PM