**​​​​​​Information Technology II**

Spring 2020

**Notice:** For the remainder of the Spring 2020 semester, Canvas will be the schedule of record. Tests will be open-book, including the final exam (if we have one). For classes with presentations, you (and your teammates) will separately record your portion, and then edit them together into one presentation. Don’t panic, you can do it. Nothing will be due from March 16-Mar 30, but on Mar 31 things will start being due. All due dates as of April 6 will remain in place, with some adjustments possible during the last week of April, due to final grade reporting requirements. I will be in my office.

For labs using routers and switches, you can use virtual software like GNS3 (version 0.8.3 is best and easiest). IOSs are in the course content, or you can find them online. Alternatively, you can use another virtual network design tool, and use either Juniper or Cisco emulation. You are all smart, and can figure this out. If you can figure out the video games that you manage to overcome, you can do this…. ☺

Keep up with the Canvas schedule – do not get behind! Easier to keep up than to catch up. We will all finish this together.

|  |  |  |
| --- | --- | --- |
|  Instructor: Dr. Alan Hughes | **Office:** | Mack Library, 2nd Floor |
| **Office:** | Library, 2nd floor |
| **Office Hours:** | MWF 2pm; Th 10am; Tuesday electronic​ |
| **Email:** | ahughes@bju.edu |
| **Telephone:** | Cell: 864-906-1024Office: 86-242-4100 x 2274​ |

**​Course Description**

An introduction to fundamental information technology concepts and troubleshooting. Problem-solving regarding installation and configuration of operating systems and common software applications with a focus on the Linux platform.

**Course Reading(s)**



Linux Administration, A Beginner's Guide - 7th Edition, by Wale Soyinka

ISBN-13: 978-0071845366

ISBN-10: 0071845364​

**​Context**

The faculty of the Computer Science department has aligned the computer science program with the goals of the Mathematical Sciences Division, BJU Bible and liberal arts core objectives, and the BJU institutional goals. The goal of the Computer Science department is to align all courses in the Computer Science and Information Technology majors to support one or more of the following departmental goals:

1. Design and implement solutions to practical problems.
2. Use appropriate technology as a tool to solve problems in various domains.
3. Create efficient solutions at the appropriate abstraction level.
4. Demonstrate an ability to work effectively in teams.
5. Demonstrate an ability to communicate technological information effectively both in written and oral forms.
6. Demonstrate an ability to acquire new knowledge in the computing discipline.
7. Demonstrate an understanding of social, professional and ethical considerations related to computing.
8. Demonstrate understanding of fundamental concepts in the student's discipline.
9. Prepare students for graduate school or to secure employment in a related area.

**Course Goals**

1. Design and implement solutions to practical problems.
2. Demonstrate an ability to work effectively in teams.
3. Demonstrate an ability to communicate technological information effectively both in written and oral forms.
4. Demonstrate an ability to acquire new knowledge in the computing discipline.
5. Demonstrate understanding of fundamental concepts in the discipline
6. Provide the student a platform for continued learning and development of his or her God-given abilities.
7. Instill in the student a desire to use his abilities in service to Christ.

**Learning Objectives**

At the end of the course, students should be able to:

|  |  |
| --- | --- |
| **Learning Objective​** | **Assessment Tools** |
| Install, configure, and understand the operational details of the Linux operating system. | Lab Projects, Quizzes, Tests​ |
| Understand the process of troubleshooting a user problem and be able to troubleshoot selected Linux operating system and application problems. | Lab Projects, Quizzes, Tests |
| Understand how to set up and troubleshoot a Linux network. | Lab Projects, Quizzes |
| Understand how to achieve interoperability between Linux and Windows. | Lab Projects, Quizzes |
| Effectively use workstation virtualization. | Lab Projects, Quizzes |

**Course Policies**

**Qualifications**

CpS201 is a pre-requisite for CpS 202.

**​​NOTE: An external hard drive or flash drive of at least 64GB is highly recommended for this class.**

**Absences, lateness, and makeup opportunities**

1. For planned absences, please email me one week in advance.
2. Written assignments should be submitted before your planned absence.
3. Scheduled tests and quizzes should be taken before your planned absence; please contact me to make arrangements for doing so.
4. For absences due to incapacitating illness or emergency, you should contact me as soon as you are able to return to class in order to make arrangements for making up any graded work without penalty.
5. In other circumstances, tests and quizzes may be made up within one week of your return, with a 10 percent grade penalty for that test or quiz.
6. Leaving class early without prior arrangement will constitute an absence.

**Late Work**

1. Assignments must be submitted using the electronic submission system before midnight on the day due.
2. The use of the submission system will be explained during the first week of class.
3. Only work missed for legitimate reasons may be made up without penalty.  Legitimate reasons include illness, a death in the family, or a BJU sanctioned tour.
4. You must make up late work according to the number of days missed - that is, missing one day of class gives you one extra day to turn in your work.
5. Any other late work will receive a 20% grade penalty.
6. All late work must be made up within one week in order to receive a non-zero grade.

**​Grade appeals**

1. Grading appeals must be made by email only no later than one week after the grade was assigned.
2. Appeals will be automatically denied if the student attempts to make the appeal verbally.
3. Email grading appeals should be made respectfully and logically (My grade should be increased because.....).

**​Academic Integrity**

1. The overarching guide for academic integrity is the [BJU Academic Integrity Policy](http://home.bju.edu/academics/integrity.pdf).
2. Cheating on assignments and tests is a form of deception and stealing, and as such, is prohibited by Scripture and will incur academic penalties.
3. All work is to be done individually unless Dr. Hughes gives permission for group work.
4. In general students are encouraged to assist one another in the lab environment, *but must exercise care when seeking assistance while completing labs*.
5. **The goal is for each student to become familiar with Linux Administration, and be able to work effectively on his or her own. therefore, please do not copy work from another person, as this constitutes cheating.**

**Class Participation**

1. Compliance with student handbook policies is expected during class.
2. Class participation grades are based upon actively participating in lecture class discussions, working diligently on course assignments in lab classes and being respectful to the rest of the class and the instructor.
3. Class participation grade will include in-class assignments throughout the semester that will be individually graded.
4. Playing games, electronic messages, working on other subjects, etc. is a demonstration of disrespect for both the instructor and other students, and is not allowed during lecture and lab classes.

**Instructor Help outside of class**

You are encouraged to use email or the telephone to ask Dr. Hughes for assistance.

**Copyright Policy**

Copyright 2009-2020 Alan Hughes as to this syllabus and all lectures. Students are prohibited from selling (or being paid for taking) notes during the course to, or by any person, or commercial firm without the express written permission of the professor teaching the course.

**Schedule**

**(subject to modification during the semester as necessary):**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Day​** | **Class** | **Assignment Due​** |
| Jan 15 | W | **Week 1**Introduction; syllabus overview; BJU Online; Introduction to Linux Operating System | Chapter 1​Read: <http://www.thegeekstuff.com/2010/09/linux-file-system-structure/><https://www.youtube.com/watch?v=_gCwCOhMcog&index=1&list=PLD6B6473ACF32C59D> |
| NOTE |  |  | **All chapter number references are pre the 7th edition, in which the order changed from the previous editions.** |
| Jan 16 | Th | Lab - VMWare, Lab 1 - Installing Ubuntu Linux | **Be sure you have an ISO in hand for both (on a flash drive or external drive is good); you can get Ubuntu at Ubuntu.com;****Read:**<http://www.howstuffworks.com/operating-system.htm> |
| Jan 17 | F | Installing Ubuntu | Chapter 2Read: <http://www.linux-tutorial.info/modules.php?name=MContent&pageid=306> |
| Jan 20 | M | **Week 2**Command LineMLK, Jr Day | Chapter 5; **Lab 1**<https://www.youtube.com/watch?v=2FiQSLdnBqA> |
| Jan 22 | W | Command Line;  | Chapter 5<https://www.youtube.com/watch?v=_JWj6u8mI7k> |
| Jan 23 | Th | Lab Day – command line; managing files and directories | ​In-class exercise: Command Line and Managing Files and Directories<https://www.youtube.com/watch?v=b0PQt4uzsDk> |
| Jan 24 | F | Managing files and directories | ​Chapter 5 |
| Jan 27 | M | **Week 3**Creating and editing files with text editors | **Lab 2 – Command line, managing files/directories** |
| Jan 29 | W | Shell Scripting | No chapter |
| Jan 30 | Th | Lab 3 | ​In-class exercise: Shell Scripting |
| Jan 31 | F | Creating Shell Scripts and Displaying File Contents | **Quiz 1 - Chapters 1, 2, 3**<https://www.youtube.com/watch?v=NSu4IWlOU7k> |
| Feb 3 | M | **Week 4**More Shell scripts | No chapter; **Lab 3**<https://www.youtube.com/watch?v=lyaGaSwHocs> |
| Feb 5 | W | Managing Users and Groups | Chapter 5<https://www.youtube.com/watch?v=zRw0SKaXSfI> |
| Feb 6 | Th | Lab 4 | ​In-class exercise: managing users and groups |
| Feb 7 | ​F | Managing Users and Groups | ​ |
| Feb 10 | M | **Week 5**Network communications | Chapters 11-12; **Lab 4**<https://www.youtube.com/watch?v=PEa1xopeufQ&list=PLD6B6473ACF32C59D&index=7> |
| Feb 12 | W | Network communications | <https://www.youtube.com/watch?v=fHgk7aDGn_4> |
| Feb 13 | Th | Lab 5 | ​Network connectivity exercise |
| Feb 14 | F | Network communications | **Quiz 2 - Ch. 5,11,12** |
| Feb 17 | M | **Week 6****Test 1** | **Chapters 1-3,5,11,12; Lab 5** |
| Feb 19 | W | Bible Conference |   |
| Feb 20 | Th | Bible Conference | ​ |
| Feb 21 | F | Bible Conference | ​ |
| Feb 24 | M | **Week 7**Installing Software Packages | Chapter 4; Lab 6 |
| Feb 26 | W | Installing Software Packages | <https://www.youtube.com/watch?v=EKmLXiA4zaQ> |
| Feb 27 | Th | **Lab Test 1** | In-class exercise: installing and updating software |
| Feb 28 | F | Apache web server | **Chapter 18** |
| Mar 2 | M | **Week 8**Apache web server | Chapter 18 |
| Mar 4 | W | Apache web server | ​Lab 7 |
| Mar 5 | Th | Lab 7 | ​In-class exercise: install WordPress and build a page |
| Mar 6 | F | Domain Name System | **Chapter 16;****Quiz 3 – Chapters 4,18, 16** |
| Mar 9 | M | **Week 9**Domain Name System | Chapter 16; Lab 8 |
| Mar 11 | W | Domain Name System | ​ |
| Mar 12 | Th | Lab 8  | ​In-class exercise: configure DNS on your Linux server |
| Mar 13 | F | Configuring a mail server | Chapters 19, 20 |
| Mar 16 | M | **Week 10**Configuring a mail server | **Lab 9** |
| Mar 18 | W | Configuring a mail server | Chapter 20 |
| Mar 19 | Th | Lab 9 | ​In-class exercise: connect to internal lab and send/receive emails |
| Mar 20 | F | Linux file system management and admin | Chapter 7; **Quiz 4 - Chapters 19,20,7** |
| Mar 23 | M | Week 11 | Chapter 7; **Lab 10** |
| Mar 25 | W | Spring Break | ​ |
| Mar 26 | Th | Spring Break | ​ |
| Mar 27 | F | Spring Break | ​ |
| Mar 30 | M | **Week 12**Linux file system management and administration; Lab 11 | ​ |
| Apr 1 | W | Linux file system management and administration | ​ |
| Apr 2 | Th | Lab 11 | ​In-class exercise: adding a disk and creating the file system |
| Apr 3 | F | Linux file system management and administration | **Quiz 5 - chapter 7** |
| Apr 6 | M | **Week 13**Core system services | **Chapter 8; Lab 11**[**https://www.youtube.com/watch?v=LTFLEXYY6jY**](https://www.youtube.com/watch?v=LTFLEXYY6jY) |
| Apr 8 | W | Core system services | ​ |
| Apr 9 | Th | No lab | ​ |
| Apr 10 | F | Secure Networking in a Linux environment (monitoring, TOP, IPS/IDS | ​**Chapter 15, 16, 17**<https://www.youtube.com/watch?v=08XeTP9uIFQ&list=PLjGbUPQu3fSTgQoGV3wHxxRqYca7y2KFD&index=11> |
| Apr 13 | M | **Week 14**Secure Networking in a Linux environment (wireshark); Lab 12 | Chapter 15, 16, 17<https://www.youtube.com/watch?v=M48naKSLvNs> |
| Apr 15 | W | Secure Networking in a Linux environment (tcpdump, iptables, netfilter) | <https://www.youtube.com/watch?v=A2uiJ2OpxCk><https://www.youtube.com/watch?v=foJHBZoEprE&index=9&list=PLjGbUPQu3fSTgQoGV3wHxxRqYca7y2KFD><https://www.youtube.com/watch?v=Qp31GYfxbA0&list=PLjGbUPQu3fSTgQoGV3wHxxRqYca7y2KFD&index=13> |
| Apr 16 | Th | Lab 12 | ​In-class exercise: FTP in-class exercise |
| Apr 17 | F | Local Security in Linux (runlevels, thinning down, hardening) | **Quiz 6 - Chapters 5, 15, 16, 17**<https://www.youtube.com/watch?v=CmBiNjCoDFk&list=PLjGbUPQu3fSTgQoGV3wHxxRqYca7y2KFD&index=8> |
| Apr 20 | M | **Week 15**Using SaMBa for interoperating Linux and Windows | Chapter 24; Lab 12<https://www.youtube.com/watch?v=zTujwRSsIBw> |
| Apr 22 | W | Using SaMBa for interoperating Linux and Windows | Chapter 24 |
| Apr 23 | Th | Lab 13 | ​In-class exercise: installing SaMBa<https://www.youtube.com/watch?v=x8Lo20C19ao> |
| Apr 24 | F | **Test 2** | **Chapters 5, 7, 8, 15, 16, 17, 19, 20, 24** |
| Apr 27 | M | **Week 16**Advanced Linux Administration | Chapter 20; Lab 13<https://www.youtube.com/watch?v=qAMWG86sEm8> |
| Apr 29 | W | Advanced Linux Administration | <https://www.youtube.com/watch?v=NodKFuUocQY> |
| Apr 30 | Th | **Lab Test 2** | ​ |
| May 1 | F | **Hacking Lab** | ​No documentation required |
| May 4 | M | **Final Exam** 12:30-1:40pm | **Comprehensive** |

**Grading**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Item** | **Pts.** | **Total** |
| 6 | Quizzes | 30 | 180 |
| 13 | Labs | 30 | 390 |
| 2 | Tests | 135 | 270 |
| ​2 | ​Lab Tests | ​75/150 | ​225 |
| 1 | Final Exam | 100 | 100 |
| 1 | Class Participation | 100 | 100 |
| ​ | ​ | ​ | ​ |
| ​ | **TOTAL** | ​ | **1265** |

**Scale**

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| --- | --- |
| A | 90-100 |
| B | 80-89 |
| C | 70-79 |
| D | 60-69 |
| F | < 60​ |

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