Network, Server, and Cloud Administration

Fall 2024

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| C:\Users\ahughes\Desktop\Dr. Alan Hughes.jpg​Instructor: Dr. Alan Hughes | **Office:** | AL76Alternatively, MB203 (CS lab in library) |
| **Office Hours:** | MWF 2pm (by appt);Tuesday, electronic;Th 10am (by appt) |
| **Email:** | ahughes@bju.edu (best, fastest way to reach me during the week) |
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​Course Description:

This course deals with administration issues that affect the planning, setup, and maintenance of computer servers and networks. Issues such as account policies, storage management, security, licensing, performance monitoring, providing support for a large user community, providing network services, etc.  You will gain experience setting up a network with Linux servers, as well as network switches and routers. You will also set up a cloud infrastructure in Amazon’s AWS.

Course Reading(s):

CompTIA Cloud+ Guide to Cloud Computing, Jill West, 2nd Edition, Copyright 2023, ISBN: 978-0-357-88345-7

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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:

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| **Learning Objective** | **Assessment Tools** |
| Understand the role and responsibilities of a system administrator. | Lab Projects; Quizzes; Tests |
| Understand private and public cloud infrastructures, advantages, disadvantages, and security concerns | Research Papers; Lab Projects, Quizzes; Tests |
| Install, configure and understand the operations of a Linux server. | Lab Projects; Quizzes; Tests |
| Install, configure and understand the operations of a Windows server. | Lab Projects; Quizzes; Tests |
| Set up and manage user accounts and groups in both Linux and Windows. | Lab Projects; Quizzes; Tests |
| Set up and perform basic configuration of representative Ethernet switches and routers. | Lab Projects; Quizzes; Tests |
| Set up a basic cloud-like server infrastructure | Lab Projects |
| Migrate a basic infrastructure to AWS | Lab Projects |
| Understand Biblical ethics required of a faithful Christian working as a system and network administrator or manager  | Writing assignments |

Course Policies:

Qualifications

CpS 433 is for students who have completed CpS 335 and (CpS 202 or CpS 320).

Absences, lateness, and makeup opportunities

1. The overarching guide for class attendance is the [BJU Class Attendance Policy](http://home.bju.edu/life/policies/class-attendance-policy.php).
2. For planned absences, please email me one week in advance.
3. Written assignments should be submitted before your planned absence.
4. Scheduled tests and quizzes should be taken before your planned absence; please contact me to make arrangements for doing so.
5. 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.
6. 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.
7. 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. Since the goal of the assignments in this course is to learn to develop the skills covered NOT complete the tasks assigned, and since the use of AI to complete or jumpstart tasks defeats the goal of the assignments, you may not use generative AI tools (i.e. Chat GPT, Bing Chat, Google Bard, etc.) in this course for any assignment without the professors express permission.  Should an AI tool be used with permission, its use must be documented.
4. All work is to be done individually unless Mr. Hughes gives permission for group work.
5. **The goal is for each student to become familiar with network, server, and cloud 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.  Group projects will be specifically assigned.**

Class Participation

1. Compliance with student handbook policies, including the dress code, 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.
5. Dress for presentations should be professional, above normal class dress.

Instructor Help outside of class

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

Copyright Policy

Copyright 2009-2024 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):**

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| --- | --- | --- | --- |
| **Date** | **Day** | **Class** | **Assignment** **Due** |
| **Week 1** |  | **Module 1 – Intro to Cloud Computing** |  |
| Aug 28 | Th | Introductions, Syllabus, Introduction to Cloud Computing |  |
| **Week 2** |  | **Module 2 – Virtual Hardware** |  |
| Sep 3 | T | Virtual Hardware |  |
| Sep 5 | Th | Building a Virtual Infrastructure – Windows and Linux Server VMs |  |
| **Week 3** |  | **Module 3 – Migration to the Cloud** |  |
| Sep 10 | T | Moving your infrastructure the cloud – considerations |  |
| Sep 12 | Th | Choose a cloud provider |  |
| **Week 4** |  | **Module 4 – Cloud Networking** |  |
| Sep 17 | T | Building out the servers |  |
| Sep 19 | Th | Building out the servers |  |
| **Week 5** |  | **Module 5 – Cloud Connectivity and Troubleshooting** |  |
| Sep 24 | T | Choose a switch and connect your servers to it |  |
| Sep 26 | Th | When things go wrong |  |
| **Week 6** |  | **Module 6 – Securing Cloud Resources** |  |
| Oct 1 | T | **Test 1 (Ch 1-5)** Securing Cloud Rsources |  |
| Oct 3 | Th | Securing Cloud Resources |  |
| **Week 7** |  | **Module 7 – Identity and Access Management** |  |
| Oct 8 | T | Install AD |  |
| Oct 10 | Th | Add users and groups |  |
| **Week 8** |  | **Module 8 – Cloud Storage** |  |
| Oct 15 | T | Cloud Storage – how much? |  |
| Oct 17 | Th | Cloud Storage |  |
| **Week 9** |  | **Module 9 – Managing Cloud Performance** |  |
| Oct 22 | T | Fall Break |  |
| Oct 24 | Th | Where are the bottlenecks? |  |
| **Week 10** |  | **Module 10 – Cloud Automating** |  |
| Oct 29 | T | Making admin easier |  |
| Oct 31 | Th | Workday in Lab |  |
| **Week 11** |  |  |  |
| Nov 5 | T | Workday in Lab |  |
| Nov 7 | Th | **Test 2 (Ch 6-10)** |  |
| **Week 12** |  |  |  |
| Nov 12 | T | Workday in Lab |  |
| Nov 14 | Th | Workday in Lab |  |
| **Week 13** |  |  |  |
| Nov 19 | T | Workday in Lab |  |
| Nov 21 | Th | Workday in Lab |  |
| **Week 14** |  | **Thanksgiving Break!** |  |
| **Week 15** |  |  |  |
| Dec 3 | T | Workday in Lab |  |
| Dec 5 | Th | Workday in Lab | **Biblical Ethics of Network/Server Administration** |
| **Week 16** |  |  |  |
| Dec 10 | T | Workday in Lab |  |
| Dec 12 | Th | Workday in Lab |  |
| Dec 16 | M | **ALL Presentations in dropbox before the Final Exam (presentations).****Final Lab Document and Presentation PPT** |  |
| **Final Exam** |  | ​ |  |
| Dec 17 | T | **Final Exam – 2:00-3:10pm** **Presentations (15 minutes per)** |  |

​Grading

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| **#** | **Item** | **Pts.** | **Total** |
| 10 | Quizzes | 30 | 300 |
| 2 | Tests  | 100 | 200 |
| 10 | Labs | 35 | 350 |
| 1 | AWS Cloud Project Document, including project management file (MS Project, or some other PM software) | 200 | 200 |
| 1 | AWS Cloud Project Presentation | 100 | 100 |
| 1 | Research Paper (Administrator Ethics) | 100 | 100 |
| ​ | Team Participation (peer-evaluated) | 100 | 100 |
| ​ | ​ | ​ | ​ |
|   | **TOTAL​** |  | **1350** |

Scale

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

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