**​​​​Computer Network Fundamentals**

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.

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**​Course Description**

A study of the hardware and software components of computer communications, including Internet protocols, network fundamentals, applications, and security.  Hands-on exercises are employed to enhance the learning experience.  This course helps prepare the student for the CompTIA Network+ certification exam.

**Course Reading(s)**

**Network+ Guide to Networks**; Tamara Dean; Cengage - Course Technology, 2013; ISBN 1133608191 (sixth edition is best)

**Lab Manual for Network+ Guide to Networks;**Todd Verge, Cengage - Course Technology, 2013; ISBN 113360823x (sixth edition is best)

**​​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** | **Assessm​ent Tools** |
| Understand and networks and networking concepts, including terminology, types of networks, and networking hardware.​ | Lab Projects; Quizzes; Written Tests |
| Understand physical and logical network topologies, and how to select the right topology for a given network objective. | Lab Projects; Quizzes; Written Tests |
| Understand and identify the various networking media, and the characteristics, advantages and disadvantages of each. | Lab Projects; Quizzes; Written Tests |
| Understand wireless network types and their various components, as well as security concerns. | Lab Projects; Quizzes; Written Tests |
| Understand Network Interface cards, their function, and configuration specifics. | Lab Projects; Quizzes; Written Tests |
| Understand the OSI and 802 networking models, including the structure of a data frame. | Lab Projects; Quizzes |
| Understand network protocols, the TCP/IP model as it relates to OSI, and IP addressing. | Lab Projects; Quizzes |
| Understand network architectures, focusing on Ethernet and Token Ring. | Lab Projects; Quizzes; Written Tests |
| Understand network operations, including DNS, directories, client-server, NOSs, and various applications. | Lab Projects; Quizzes; Written Tests |
| Understand complex network, including terminal services, thin-client, web-based networks, and the mainframe. | Lab Projects; Quizzes; Written Tests |
| Understand the fundamentals of network security, and administration and support of networks. | Lab Projects; Quizzes; Written Tests |
| Understand enterprise and wide-area networks. | Lab Projects; Quizzes; Written Tests |
| Understand Biblical ethics required of a faithful Christian working as a network manager. | Lab Projects; Quizzes; Written Tests​ |

**Course Policies:**

**Qualifications**

CpS 201 is a pre-requisite for CPS335.

**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. 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 Networking, 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;Introduction to Networking and Concepts | Chapter 1 |
| Jan 17 | F | Introduction to Networking and Concepts; Lab 1 | Chapter 1 |
| Jan 20 | M | **Week 2**Martin Luther King Jr DayNetwork Standards and OSI; Lab 2 | Chapter 2, Lab 1 |
| Jan 22 | W | Network Standards and OSI | ​ |
| Jan 24 | F | Network Standards and OSI | ​ |
| Jan 27 | M | **Week 3**Transmission Basics & Networking Media; Lab 3 | Chapter 3, Lab 2; **Quiz 1** |
| Jan 29 | W | Transmission Basics & Networking Media | ​ |
| Jan 31 | F | Transmission Basics & Networking Media | ​ |
| Feb 3 | M | **Week 4**Introduction to TCP/IP Protocols | Chapter 4, Lab 3 |
| Feb 5 | W | Introduction to TCP/IP Protocols | ​ |
| Feb 7 | F | Introduction to TCP/IP Protocols | ​ |
| Feb 10 | M | **Week 5**Topologies & Ethernet Standards; Lab 5 | Chapter 5, Lab 4 |
| Feb 12 | W | Topologies & Ethernet Standards | **Quiz 2** |
| Feb 14 | F | Topologies & Ethernet Standards | ​ |
| Feb 17 | M | **Week 6****Test 1** | **Test 1** |
| Feb 19 | W | Bible Conference |   |
| Feb 21 | F | Bible Conference | ​ |
| Feb 24 | M | **Week 7**Network Hardware, Switching & Routing; Lab 6 | Chapter 6, Lab 5 |
| Feb 26 | W | Network Hardware, Switching & Routing |   |
| Feb 28 | F | Network Hardware, Switching & Routing | ​ |
| Mar 2 | M | **Week 8**Wide Area Networks; Lab 7 | Chapter 7, Lab 6 |
| Mar 4 | W | Wide Area Networks | ​ |
| Mar 6 | F | Wide Area Networks | **Quiz 3** |
| Mar 9 | M | **Week 9**Wireless Networking; Lab 8 | Chapter 8, Lab 7 |
| Mar 11 | W | Wireless Networking | ​ |
| Mar 13 | F | Wireless Networking | ​ |
| Mar 16 | M | **Week 10**In-depth TCP/IP Networking; Lab 9 | Chapter 9, Lab 8 |
| Mar 18 | W | In-depth TCP/IP Networking | ​ |
| Mar 20 | F | In-depth TCP/IP Networking | ​**Quiz 4; Lab 9** |
| Mar 23 | M | **Week 11**Spring Break |  |
| Mar 25 | W | Spring Break | ​ |
| Mar 27 | F | Spring Break | ​ |
| Mar 30 | M | **Week 12**Virtual Networks & Remote Access; Lab 10 | Chapter 10 |
| Apr 1 | W | Virtual Networks & Remote Access | ​ |
| Apr 3 | F | Virtual Networks & Remote Access | ​ |
| Apr 6 | M | **Week 13**Network Security; Lab 11 | Chapter 11, Lab 10 |
| Apr 8 | W | Network Security | ​ |
| Apr 10 | F | Network Security | **Quiz 5** |
| Apr 13 | M | **Week 14**Troubleshooting Network Problems; Lab 12 | Chapter 13, Lab 11 |
| Apr 15 | W | Troubleshooting Network Problems |   |
| Apr 17 | F | Troubleshooting Network Problems | ​ |
| Apr 20 | M | **Week 15**Ensuring Integrity and Availability; Lab 13 | Chapter 14, Lab 12 |
| Apr 22 | W | Ensuring Integrity and Availability | ​ |
| Apr 24 | F | Ensuring Integrity and Availability | **Quiz 6** |
| Apr 27 | M | **Week 16****Test 2**; Network Management | **Test 2**; Chapter 15, **Network Proposal; Lab 13** |
| Apr 29 | W | Network Management | ​ |
| May 1 | F | Network Management**; Review for Final Exam** | ​ |
| May 5 | Tue | **Final Exam - 9:30-10:40am** | **Comprehensive** |

**​Grading**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Item** | **Pts.** | **Total** |
| 6 | Quizzes | 20 | 120 |
| 13 | Labs | 30 | 390 |
| 1 | Network Proposal Project | 150 | 150 |
| 2 | Tests | 100 | 200 |
| 1​ | Final Exam | 140 | 140 |
| ​ | Class Participation | 100 | 100 |
| ​ | ​ | ​ | ​ |
|   | **TOTAL​** |  | **1100** |

**Scale**

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



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