**​​​​CpS 335 - Computer Network Fundamentals**

Spring 2024

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| Instructor: Dr. Alan Hughes | **Office:** | AL76 (alternatively MB203) |
| **Office Hours:** | MWThF 10am by appointment; Tue electronic |
| **Email:** | ahughes@bju.edu​ |
| **Telephone:** | Cell: 864-906-1024Office: 86-242-4100 x​2274 |
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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**; West, Andrews, Dean; Cengage - Course Technology, 2016, 2019; ISBN: 978-1-3375-6933-0



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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** | **Assessm​ent Tools** |
| Explain and networks and networking concepts, including terminology, types of networks, and networking hardware.​ | Lab Projects; Quizzes; Written Tests |
| Identify and describe network and cabling equipment, understand network diagrams, understand change control in a network | Lab Projects; Quizzes; Written Tests |
| Explain physical and logical network topologies, and how to select the right topology for a given network objective, understand ports/sockets, know several well-known ports/protocols. | Lab Projects; Quizzes; Written Tests |
| Describe the core TCP/IP protocols, explain how routers work, practice troubleshooting. | Lab Projects; Quizzes; Written Tests |
| Identify the various networking media, and the characteristics, advantages and disadvantages of each. | Lab Projects; Quizzes; Written Tests |
| Identify wireless network types and their various components, as well as security concerns, implement a wi-fi network. | Lab Projects; Quizzes; Written Tests |
| Describe and use virtualization technologies, create a cloud computing environment, create a VLAN | Lab Projects; Quizzes; Written Tests |
| Describe Network Interface cards, their function, and configuration specifics. | Lab Projects; Quizzes; Written Tests |
| Explain the OSI and Internet networking models, including the structure of a data frame. | Lab Projects; Quizzes |
| Explain network operations, including DNS, directories, client-server, NOSs, and various applications. | Lab Projects; Quizzes; Written Tests |
| Create a secure network design and proposal. | Lab Projects; Quizzes; Written Tests; Network Proposal |
| Describe the Biblical ethics required of a faithful Christian working as a network manager or administrator.. | Biblical ethics paper |

**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 25% 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. 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 professor’s express permission.  Should an AI tool be used with permission, its use must be documented.
6. **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. Earbuds not allowed in class.
5. 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**

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**Schedule**

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

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| --- | --- | --- | --- |
| **Date** | **Day** | **Class** | **Assignment** **Due** |
| **Week 1** |  | **Chapter 1** |  |
| Jan 10 | W​ | Introduction; syllabus overview;Introduction to Networking  | Chapter 1 |
| Jan 12 | F | Introduction to Networking | Chapter 1 |
| **Week 2** |  | **Chapter 2** |  |
| Jan 15 | M | Martin Luther King Jr Day – no classNetwork Infrastructure & Documentation | Chapter 2, Lab 1; Quiz 1 |
| Jan 17 | W | Network Infrastructure & Documentation | ​ |
| Jan 19 | F | Network Infrastructure & Documentation | ​ |
| **Week 3** |  | **Chapter 3** |  |
| Jan 22 | M | Addressing on Networks | Chapter 3, Lab 2; Quiz 2 |
| Jan 24 | W | Addressing on Networks | ​ |
| Jan 26 | F | Addressing on Networks | ​ |
| **Week 4** |  | **Chapter 4** |  |
| Jan 29 | M | Network Protocols & Routing | Chapter 4, Lab 3; Quiz 3 |
| Jan 31 | W | Network Protocols & Routing | ​ |
| Feb 2 | F | Network Protocols & Routing | ​ |
| **Week 5** |  | **Chapter 5** |  |
| Feb 5 | M | Network Cabling | Chapter 5, Lab 4; Quiz 4 |
| Feb 7 | W | Network Cabling |  |
| Feb 9 | F | Network Cabling | ​ |
| **Week 6** |  | **Test 1** | **Test 1** |
| Feb 12 | M | **Test 1** |  |
| Feb 14 | W | Bible Conference |   |
| Feb 16 | F | Bible Conference | ​ |
| **Week 7** |  | **Chapter 6** |  |
| Feb 19 | M | Wireless Networking | Chapter 6, Lab 5; Quiz 5 |
| Feb 21 | W | Wireless Networking |   |
| Feb 23 | F | Wireless Networking | ​ |
| **Week 8** |  | **Chapter 7** |  |
| Feb 26 | M | Virtualization & Cloud Computing | Chapter 7, Lab 6; Quiz 6 |
| Feb 28 | W | Virtualization & Cloud Computing | ​ |
| Mar 1 | F | Virtualization & Cloud Computing |  |
| **Week 9** |  | **Chapter 8** |  |
| Mar 4 | M | Subnets & VLANs | Chapter 8, Lab 7; Quiz 7 |
| Mar 6 | W | Subnets & VLANs | ​ |
| Mar 8 | F | Subnets & VLANs | ​ |
| **Week 10** |  | **Chapter 9** |  |
| Mar 11 | M | Network Risk Management | Chapter 9, Lab 8; Quiz 8 |
| Mar 13 | W | Network Risk Management | ​ |
| Mar 15 | F | Network Risk Management | ​ |
| **Week 11** |  | **Spring Break! March 18-22** |  |
| **Week 12** |  | **Chapter 10** |  |
| Mar 25 | M | Security in Network Design | Chapter 10; Lab 9; Quiz 9 |
| Mar 27 | W | Security in Network Design | ​ |
| Mar 29 | F | **Test 2 (Ch 6-9)** | ​ |
| **Week 13** |  | **Chapter 11** |  |
| Apr 1 | M | Network Performance & Recovery | Chapter 11, Lab 10; Quiz 10 |
| Apr 3 | W | Network Performance & Recovery | ​ |
| Apr 5 | F | Network Performance & Recovery |  |
| **Week 14** |  | **Chapter 12** |  |
| Apr 8 | M | Wide Area Networks | Chapter 12, Lab 11; Quiz 11 |
| Apr 10 | W | University Service Day |   |
| Apr 12 | F | Wide Area Networks | ​ |
| **Week 15** |  | **Chapter 12 (cont’d)** |  |
| Apr 15 | M | Wide Area Networks | Chapter 12 |
| Apr 17 | W | Wide Area Networks | ​ |
| Apr 19 | F | Wide Area Networks | Biblical Ethics Paper |
| **Week 16** |  |  |  |
| Apr 22 | M | **Network Proposal** | **Network Proposal; Lab 12; Quiz 12** |
| Apr 24 | W | **Network Proposal** | ​ |
| Apr 26 | F | **Network Proposal** | ​ |
| **Week 17** |  | Final Exams |  |
| Apr 29 | Mon | **Final Exam – 8:00-9:10am** | **Comprehensive** |

**​Grading**

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| --- | --- | --- | --- |
| **#** | **Item** | **Pts.** | **Total** |
| 12 | Quizzes | 30 | 360 |
| 12 | Labs | 35 | 420 |
| 1 | Network Proposal Project | 200 | 200 |
| 1 | Biblical Ethics Paper | 100 | 100 |
| 2 | Tests | 100 | 200 |
| 1​ | Final Exam (see note below) | 200 | 200 |
| ​ | Class Participation | 100 | 100 |
|   | **TOTAL​** |  | **1580** |
| **NOTE: If you pass the CompTIA Network+ Exam before the final exam, if you have done all the work (labs/quizzes), and have a B- or better, you will get an A and be exempt from the final exam.** |

**Scale**

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



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