SAN JOSE STATE UNIVERSITY
Department of Aviation &Technology

Tech 165
Fall 2012
Lecture: M 0900 – 1050, Eng 103
Lab: W 0900 – 1145, Eng 103
E-mail: julio.garcia@sjsu.edu
Web page: www.engr.sjsu.edu/jgarcia/

Dr. Julio R. Garcia
Office: IS 101
Phone: (408) 924-3222
Office Hrs:
W: 1400 – 1500
R: 1700 – 1800

Wireless Communications Technologies

Course Description

Digital wireless technologies. RF Communications. Wireless Personal Area Networks. Wireless Local Area Networks. Wireless Metropolitan Area Networks. Wireless Satellite Fixed Broadband. Wireless Wide Area Networks. Radio Frequency Identification. Wireless Communications in Business. Emerging wireless technologies. Prerequisites: Tech 63 and Tech 65.

Student Learning Objectives

Upon successful completion of this course, students will be able to:

a. Describe the limitations, advantages, and disadvantages of each major wireless network architecture.

b. Identify and select appropriate hardware and software for specific WLAN needs.

c. Troubleshoot a basic wireless computer network.

d. Design and setup a simple wireless LAN.

Course Overview

This course focuses on principles of wireless communications. The lectures are intended to stress the fundamentals of wireless communications technologies including in-depth coverage of protocols, transmission methods, and IEEE 802.11 standards that are important to any mobile communication system. Features extensive learning tools, including Review Questions and Hands-On Projects which allow students to practice skills as they are learned. A chapter dedicated to how wireless communications are used in the business world illustrates how concepts relate to real-world applications.

The laboratory assignments include the design and setup of a simple wireless LAN. As part of the course work, students are required to write a research paper on a topic relevant to wireless communications. The objective of the research paper is for students to digest more emerging topics and techniques in wireless communications that are not covered in the lectures.

Textbooks

Ciampa, M. & Jorge Olenewa, J. (2007). Guide to Wireless Communications. 2nd Ed. Cambridge, MA: Course Technology.

Evaluation

The final grade for the course will be based on the following items:

Lab Assignments	20%
Class Participation/Case Projects	10%
Quizzes (4)	10%
Midterms (2)	10%
Research Paper	10%
Oral Presentation	10%
Final Exam	15%
Implementation of Practical scenarios	15%

Note: You can check your standing in the class by checking on Desire2Learn (***sjsu.desire2learn.com***). Notify the instructor immediately if there is an error in any of your grades. ***The last day to correct any discrepancy is the last day of instruction.*** There will be no change in your grade after the final grade has been submitted to the university.

Click on the ***News*** tab on Desire2Learn for updated information regarding this class.

Grading Scale

The final grade will be determined according to the following scale:

A+	96 - 100%	B+	87 – 89.9%	C+	77 – 79.9%	D+	66 - 69.9%
A	93 – 95.9%	B	83 – 86.9%	C	73 - 76.9%	D	60 - 65.9%
A-	90 – 92.9%	B-	80 – 82.9%	C-	70 - 72.9%	F	0 - 59.9%

Methodology:

To achieve an effective teaching/learning outcome the following methodology will be used:

1. You will study the assigned chapter/material before coming to lecture by reading the textbook and reviewing the PowerPoint presentation posted on Desire2Learn (***sjsu.desire2learn.com).*** Click on the Content tab.

2. After reviewing the chapter materials you will answer the Case Projects at the end of the chapter.

3. Be prepared to check your answers of the Case Projects and participate in Group Discussion. This will constitute your ***class participation*** grade. This group discussion will reinforce and/or enhance your networking knowledge with current and relevant information.

4. Instructor will explain key points and answer questions from students. Instructor may add related material to enrich the course content. Instructor will become more as a facilitator of learning. This means that the instructor will provide as much individual or group assistance as needed.

5. You should work and learn in teams. This is very important to be successful in the real world.

6. You will take four quizzes, two Midterms and the Final Exam. Students will have the opportunity to practice these tests before taking the actual ones. Quizzes, Midterms and the Final Exam will begin and end at the scheduled time.

Lab Assignments

You will perform lab activities to install, configure, and optimize basic wireless networks. You will answer the hands-on projects indicated in the textbook. It is possible that you might need to rethink your answers to the hands-on projects and this is part of the learning process. It is strongly recommended that you work in teams. In addition, you will perform some basic troubleshooting. It is to your advantage and professional development to do a conscious work and do not procrastinate. It is strongly recommended that you practice these laboratory assignments on a continuous basis rather than all of them at once. You will be evaluated three times during the semester to ensure that you are performing the labs and verify your skills development.

Research Paper

Each student will write a research paper on a topic relevant to wireless communications. The research paper must include a title page, index, introduction, main body, conclusions, and references. The main body should have between 10 to 15 pages, double-spaced. Submit your research paper as an attachment in PDF format or in WORD and as a single electronic file. This means that the title page, main body, circuit, references and any appendices must be incorporated in a single document.

Oral Presentation

Students will explain their findings of the research paper to the class. Each student has a 10-15 minutes time frame to get their points across. It is strongly recommended that you rehearse your presentation and use a professional presentation software package such as PowerPoint.

Implementation of Practical scenarios

Students working in groups of 2-4 will be responsible for implementing the following scenarios. The outcome should be the implementation of each scenario and a written report. Include snapshots to make the report easy to follow**.**

1. Design and setup a small wireless network. For example, this small wireless network could consist of a desktop, a laptop, a Tablet, a Smartphone, a scanner or a printer. You will provide your own hardware and software and will decide on the best NOS and the appropriate setup. This small network should be able to access files among all workstations, access to a printer and/or access to a scanner. The members of this team must show his/her mastery of these skills by videotaping all the process including but not limited to parts identification, hardware/software installation, peripherals configuration and configuration

setup. This means that while one of the members is performing the process, another member is videotaping him/her. Then take turns. The video tape must be submitted on a CD or a DVD.

2. Setup a private network where only members of the group can have access to this network.
3. We want to remotely access files and applications. In other words. We want to access files and applications from anywhere.
4. Establish a video chat using Skype in Tablets
5. Setup a way to teach/assess oral communication skills via online
6. Show how to use any type of applications installed in our computer to another user or users at a distance. In addition, the user(s) must show you the mastery of the concepts you just explained. For example, assuming that you are in San Jose, CA and want to demonstrate the use of Multisim or another software to a coworker in India. Then you want to verify that the coworker in India has understood it.
7. We want to control a computer located in New York from your office located in San Jose, CA.
8. You want to print a document. The printer is in your office and your computer is at home.

University, College, or Department Policy Information

a) Academic integrity statement (from the Office of Student Conduct and Ethical Development):

"Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the university's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct.

b) Campus policy in compliance with the Americans with Disabilities Act:

"If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability."

Course Schedule and Reading Assignments

Ciampa, M. & Jorge Olenewa, J. (2007). Guide to Wireless Communications. 2nd Ed. Cambridge, MA: Course Technology.

Date (approx.)**	Topic
Aug 22nd	• Introduction/Orientation/Greensheets *Prepare for next session:* **Read** Chapter 1: Introduction to Wireless Communications Review PPT, Chapter 1 Answer Case Projects, Chapter 1
Aug 27th	• Check answers Case Projects, Chapter 1 • Discussion questions and Case Projects • Select Research Paper Topic due on Sep 17th *Prepare for next session:* **Read** Chapter 2: Wireless Data Transmission Review PPT, Chapter 2 Answer Case Projects, Chapter 2
Sept 10th	• Check answers Case Projects, Chapter 2 • Discussion questions and Case Projects • Select Research Paper Topic due on Sep 17th • **Take** Practice Quiz 1. You can take this test as many times as you wish *Prepare for next session:* **Read** Chapter 3: Understanding Radio Frequency Communications Review PPT, Chapter 3 Answer Case Projects, Chapter 3
Sept 17th	• Check answers Case Projects, Chapter 3 • Discussion questions and Case Projects • Research Paper Topic due • **Take *Quiz 1 – 100% (Chapters 1 & 2). Test not taken by the due date and time will have a grade of 00.*** *Prepare for next session:* **Read** Chapter 4: How Antennas Work Review PPT, Chapter 4 Answer Case Projects, Chapter 4

Sept 24th

- Check answers Case Projects, Chapter 4
- Discussion questions and Case Projects
- Start working on Research Paper Topic and Oral Presentation
- **Take** Practice Quiz 2. You can take this test as many times as you wish

Prepare for next session:
Read Chapter 5: Low Rate Wireless Personal Area Networks
Review PPT, Chapter 5
Answer Case Projects, Chapter 5

Sept 26th ***Lab Evaluation 1***

Oct 1st

- Check answers Case Projects, Chapter 5
- Discussion questions and Case Projects
- Continue working on Research Paper Topic and Oral Presentation
- **Take *Quiz 2 – 100% (Chapters 3 & 4)*. *Test not taken by the due date and time will have a grade of 00.***

Prepare for next session:
Take Practice **Midterm No. 1**. You can take this test as many times as you wish.

Oct 8th

- **Take *Midterm No. 1 – 100% (Chapters 1 to 5)*. *Test not taken by the due date and time will have a grade of 00.***
- Continue working on Research Paper Topic and Oral Presentation

Prepare for next session:
Read Chapter 6: High Rate Wireless Personal Area Networks
Review PPT, Chapter 6
Answer Case Projects, Chapter 6

Oct 15th

- Check answers Case Projects, Chapter 6
- Discussion questions and Case Projects
- Continue working on Research Paper Topic and Oral Presentation

Prepare for next session:
Read Chapter 7: Low-Speed Wireless Local Area Networks
Review PPT, Chapter 7
Answer Case Projects, Chapter 7

Oct 22nd

- Check answers Case Projects, Chapter 7
- Discussion questions and Case Projects
- Start Oral Presentations
- **Take** Practice Quiz 3. You can take this test as many times as you wish
- Continue working on Research Paper Topic and Oral Presentation

Prepare for next session:
Read Chapter 8: High-Speed WLANs and WLAN Security
Review PPT, Chapter 8
Answer Case Projects, Chapter 8

Oct 29th

- Check answers Case Projects, Chapter 8
- Discussion questions and Case Projects
- Continue Oral Presentations
- **Take *Quiz 3 – 100% (Chapters 6 & 7)*. *Test not taken by the due date and time will have a grade of 00.***
- Continue working on Research Paper Topic and Oral Presentation
- **Start working on *Implementation of Practical scenarios***

Prepare for next session:
Read Chapter 9: Wireless Metropolitan Area Networks
Review PPT, Chapter 9
Answer Case Projects, Chapter 9

Oct 31st ***Lab Evaluation 2***

Nov 5th

- Check answers Case Projects, Chapter 9
- Discussion questions and Case Projects
- Continue Oral Presentations
- **Take** Practice Quiz 4. You can take this test as many times as you wish
- Continue working on Research Paper Topic and Oral Presentation
- Continue working on ***Implementation of Practical scenarios***

Prepare for next session:
Read Chapter 10: Wireless Wide Area Networks
Review PPT, Chapter 10
Answer Case Projects, Chapter 10

Nov 19th

- Check answers Case Projects, Chapter 10
- Discussion questions and Case Projects
- Continue Oral Presentations
- **Take *Quiz 4 – 100% (Chapters 8 & 9)*. *Test not taken by the due date and time will have a grade of 00.***
- Continue working on Research Paper Topic and Oral Presentation
- Continue working on ***Implementation of Practical scenarios***
- **Take** Practice **Midterm No. 2**. You can take this test as many times as you wish

Nov 26th

- **Take *Midterm No. 2 – 100% (Chapters 6 to 10)*. *Test not taken by the due date and time will have a grade of 00.***
- Continue working on Research Paper Topic and Oral Presentation
- Continue working on ***Implementation of Practical scenarios***

Prepare for next session:
Read Chapter 11: RFID - Radio Frequency Identification
Review PPT, Chapter 11
Answer Case Projects, Chapter 11

Dec 3rd

- Check answers Case Projects, Chapter 11
- Discussion questions and Case Projects
- Continue Oral Presentations
- Continue working on Research Paper Topic and Oral Presentation
- Continue working on ***Implementation of Practical scenarios***

Prepare for next session:
Read Chapter 12: Wireless Communications in Business
Review PPT, Chapter 12
Answer Case Projects, Chapter 12

Dec 5th ***Lab Evaluation 3.*** **Demonstrate *Implementation of Practical scenarios*** and **Submit** group written report through D2L

Dec 10th

- Check answers Case Projects, Chapter 12
- Discussion questions and Case Projects
- **Finish** Oral Presentations
- **Submit *Research Paper*** through D2L

Dec 17th **Final Exam (Monday, 0715 – 0930)**

**** Subject to change with fair notice**

PROPOSED RESEARCH PAPER TOPICS

1. Antennas in Wireless communications
2. WPAN-Wireless Personal Area Networks
3. WLAN -Wireless Local Area Networks
4. WMAN Wireless Metropolitan Area Networks
5. WWAN Wireless Wide Area Networks
6. Satellite Fixed Broadband Wireless
7. RFID - Radio Frequency Identification
8. Land Mobile Radio Systems
9. Radio Frequency Communications
10. Wireless Network Security
11. 3G and 4G Technologies
12. Consumer satellite Communications
13. WiMAX
14. Infrared Technologies
15. Other. Obtain instructor's approval