TEL312 Course Syllabus, Spring 2009

WESTERN CAROLINA UNIVERSITY
DEPARTMENT OF ENGINEERING AND TECHNOLOGY
KIMMEL SCHOOL

COURSE SYLLABUS: SPRING 2009

TEL312 ELECTRONIC COMMUNICATIONS FUNDAMENTALS
(4 CREDIT HOURS)

Instructor: Dr. Robert Adams
Office: 335 Belk Building
Office Telephone: 227-2437
E-mail: radams@email.wcu.edu
Course Web Site: http://paws.wcu.edu/radams
Class times: MWF 10:10 – 11:00 am, BELK 364
T 3:35 – 5:15 pm, BELK 355
Office Hours: Posted on office door

COURSE DESCRIPTION:

TEL312 involves the study of basic communications theory, as well as typical communications system blocks. Amplitude Modulation (AM) and Frequency Modulation (FM) will be used as examples to cover analog communications fundamentals. Amplitude Shift Keying (ASK) and Frequency Shift Keying (FSK) will be used as examples to cover digital communications fundamentals. Communications system design will be implemented through lab experiments. Additionally, Matlab® will be used for communications system simulation and signal analysis.

Prerequisites: ECET 242 Electronics and Math 153 Calculus I
Credit Hours: 4
Contact Hours: 5 (Lecture: 3  Lab: 2)

REQUIRED TEXT:

LEARNING OUTCOMES, ACTIVITIES, AND EVALUATION PROCEDURES:

A. General Course Goals/Objectives:

The objective of this course is to introduce the students’ knowledge of electronic communications fundamentals. Laboratory experiments are used to verify the lecture contents, and to enhance the students’ abilities in communications system block design, measurements, data collection, presentation and analysis.
B. Course Learning Objectives

Upon completion of this course, the student will be able to accomplish the following:
1. Understand and apply basic communications concepts such as signal representation, spectral analysis, signal-to-noise ratio, modulation, and demodulation.
2. Design and implement communications systems using mixers, local oscillators, filters, and amplifiers.
3. Apply software tools to the design and simulation of communications systems.
4. Apply Fourier Series and Fourier Transforms for the analysis of communication systems.
5. Utilize laboratory instruments and equipment to implement communication systems.
6. Prepare written formal reports of the design, analysis and implementation of communication systems.
7. Understand and discuss government regulations regarding the transmission of communication signals.

Evaluation strategies: Unit tests, and performance with lab experiments with reports.

ADDITIONAL EVALUATION STRATEGIES:

Comprehensive final exam

COURSE REQUIREMENTS:

Computer Usage:
Computers are used for signal generation and Matlab® analysis.

Calculus Usage:
Some knowledge in Calculus required.

Library Usage:
In this course, no formal library assignment is required. However, the students are expected to research for their lab reports. In addition to resources available in the university library, a wide collection of books and magazine articles are available in the Department’s data book library in Belk 360.

The university policies on Attendance, Grading, Conduct, and Honesty will be strictly adhered to. University regulations may be found in the student handbook.

Students who are covered under the American Disability Act should privately inform the teacher of the fact so that appropriate instructional arrangements can be made.

Exams:
There will be three 1 hour exams and one 2½ hour final exam. All exams are closed book, however one sheet of notes is permitted and a sheet of formulas and essential information will be provided. Calculators are required on all exams. The use of computers, cell phones, pagers, or PDA’s during quizzes is not permitted.
The lab practical will be required in the last week of the class. Students will be required to demonstrate laboratory skills exercised throughout the course. The lab practical will account for 20% of the final exam grade.

**Lab reports:**

Each laboratory experiment will require a lab report. Some of the lab reports will be formal reports which will require pre-lab calculations, and a set of post-lab questions to address in the report. The format of the formal lab report is on the course web site. Some of the lab reports will be shorter and will require a brief summary of the experimental and the results.

**Makeup exams:**

In the case of a medical or other emergency, a student will be permitted to take a makeup exam. In either case, it is the student’s responsibility to provide proof of the circumstances that prevent attending the exam. If there is any foreseen legitimate reason why a student cannot attend an exam, it is the student’s responsibility to inform the instructor at least 24 hours prior to the exam date.

**Computer Usage:**

Matlab will be used to simulate wireless systems as part of the laboratory component of the course. Use of the internet during lectures and class activities is not permitted.

**Attendance policy:**

While it is strongly encouraged for all students to attend class, attendance is not required. It is the student’s responsibility to obtain the missed material from a fellow student.

**GRADING POLICY:**

The percentage weights of the semester grade will be distributed as follows:

- Hour exams (3) 30%
- Final Exam 25%
- Homework 15%
- MATLAB Simulation 5%
- Lab Reports 25%
- Total 100%

All exams are closed book. One sheet of Instructor’s Special Grading Policy Comments:

- Homework is due on Friday at the start of class.
- All labs must be observed, signed and dated by the instructor.
- Late labs and homework will receive a zero.
- Lab reports are due in class on Friday following the last lab period.
- Any assignment missed due to an excused absence will be due during the next class period.
### ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Western Carolina University is committed to providing equal educational opportunities for students with documented disabilities. Students who require disability services or reasonable accommodations must identify themselves as having a disability and provide current diagnostic documentation to Disability Services. All information is confidential. Please contact Disability Services for more information at (828) 227-2716 or 144 Killian Annex.

### Course Activities – Lectures (Tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Subject</th>
<th>Exam dates</th>
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<tbody>
<tr>
<td>1</td>
<td>1/12-1/16 Chapter 1 – Intro. To Electronic Communications</td>
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<td>No Class on Monday Jan. 19</td>
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<td>2</td>
<td>1/21-1/23 Chapter 1 – Intro. To Electronic Communications</td>
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<td>3</td>
<td>1/26-1/30 Chapter 2 – Signal Analysis and Mixing</td>
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<td>4</td>
<td>2/2-2/6 Chapter 2 – Signal Analysis and Mixing</td>
<td>Exam 1 Feb 6</td>
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<td>5</td>
<td>2/9-2/13 Chapter 2 – Signal Analysis and Mixing</td>
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<td>6</td>
<td>2/16-2/20 Chapter 4 – AM Transmission</td>
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<td>2/23-2/27 Chapter 5 – AM Reception</td>
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<td>3/2-3/6</td>
<td>No Class - Spring Break</td>
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<td>9</td>
<td>3/16-3/20 Chapter 7 – FM/PM Transmission</td>
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<td>10</td>
<td>3/23-3/27 Chapter 8 – FM/PM Reception</td>
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<td>11</td>
<td>3/30-4/3 Chapter 8 – FM/PM Reception</td>
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<td>12</td>
<td>4/6 Chapter 9 – Digital modulation</td>
<td>Exam 3 April 6</td>
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<td>No Class 4/8 to 4/10 - Easter Break</td>
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<td>13</td>
<td>4/13-4/17 Chapter 9 – Digital modulation</td>
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<td>14</td>
<td>4/20-4/24 Chapter 9 – Digital modulation</td>
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<td>15</td>
<td>4/27-5/1 Review for Final</td>
<td>Lab practical, May 1</td>
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**The Final Exam is on Tuesday, May 6, 2008, 8:30 – 11:00 am in Belk 364.**