COURSE DESCRIPTION: Telecommunications systems, telephone, television, data networks, computer networks, integrated voice and data

PRE-REQUISITES: EETBD 330; EETBD 455

TEXT: Electronic Communication Systems: Fundamentals thru Advanced- by Tomasi

REFERENCE: Learning with LabVIEW - by Bishop
Internet Applications in LabVIEW - by Travis
Electronic Communications - by Roddy, Coolen
Data Communications, Computer Networks and Open Systems - by Halsall
Telecommunications Technology Handbook - by Minoli

INSTRUCTOR: Mr. David Loker -- 898-6478, B-180, DRL3@psu.edu

OFFICE HOURS: Wed. 11:00 - 11:50, 1:00 - 1:50, or by appt.

LECTURE: Wed. -- 12:00 - 12:50 – S126
Fri. -- 12:00 - 12:50 – N170

LABORATORY: Tue. -- 8:00 - 9:50 – P105

GRADING: Exams (2 @ 20%) - 40%
Laboratory - 35%
Research Project - 20%
Homework - 5%

A  93-100  B  83-86.9  C  70-76.9
A-  90-92.9  B-  80-82.9  D  60-69.9
B+  87-89.9  C+  77-79.9  F less than 60

HOMEWORK: Homework will be due every Wednesday (except as otherwise indicated) from the previous week's assigned problems. When handing in your assignment, place name, date, course number, and title of assignment in the upper right corner of the paper. Use only 8.5” x 11” paper and write on one side of the paper only. Illegible papers will not be collected or graded.

LAB REPORTS: Lab reports will be due the week following the completion of the experiment indicated on the tentative lab schedule. The outlines for both the formal and informal lab reports are attached.

POLICIES:
1. Acts of academic dishonesty will not be tolerated. It is unacceptable to copy homework, lab work, lab reports, or exams. It is also unacceptable to allow anyone else to copy your work. The affected assignment will be given a failing grade.
2. No make-up exams will be given. However, consideration will be given to exceptional circumstances explained in writing.
3. Homework assignments are to be turned in at the beginning of the class period on the due date. No late homework assignments will be accepted or graded.
4. Lab reports are due at the beginning of the lab period on the due date. The overall grade for lab reports will be reduced by 10% for each day late. Each lab experiment is to be demonstrated to the instructor before the next lab experiment is scheduled to begin.

RESEARCH PROJECT: A team research project will be required. The grade for the research project will be worth 20% of the total grade for the course. Details about the research project will be given during the semester.
General comments about the course:

- My primary responsibilities are:
  - To make certain that you understand the material through lecturing and problem solving. *I can't make certain that you understand the material without getting adequate feedback from you.*
  - To provide feedback to you through graded homework, quizzes, exams, and lab work.

- Your primary responsibilities are:
  - To learn (or master) the material. *This is accomplished by completing and understanding all assigned work and by asking questions during class. Stop me if you don't understand the material.*
  - To provide feedback to the instructor during the lectures on whether you understand the material.

- This class will probably require more work than most of the other classes you have taken at PSU. Many of the labs focus on solving real-world problems and will require outside class time to successfully complete. This is done in order to better prepare you to enter the job market and be successful at obtaining the right job. *Plan to spend on average approximately 6-9 hours of productive outside class time per week to successfully complete all the course work.*

- This course involves software development. In order to successfully complete this course, you must be proficient in LabVIEW.

- I will do everything I can to help you be successful in this course!

After completing this course, a student should be able to:

1. Understand the concept of the Nyquist sample theorem
2. Understand how to use LabVIEW for PC to PC communication using the serial port
3. Understand how to program a PC-based data acquisition board for analog I/O
4. Understand how to program a PC-based data acquisition board for digital I/O
5. Understand how to program a modem for communication over the telephone lines
6. Understand various digital modulation techniques
7. Understand how to use LabVIEW for remote control using a web browser

“Press on: Nothing in the world can take the place of perseverance.”
*(Calvin Coolidge)*
<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>CHAPT</th>
<th>TOPICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/2,9/3,9/5</td>
<td>LabVIEW reference</td>
<td>Review of LabVIEW programming</td>
</tr>
<tr>
<td>2</td>
<td>9/10,9/12</td>
<td>Handout</td>
<td>DTMF</td>
</tr>
<tr>
<td>3</td>
<td>9/17,9/19</td>
<td>15</td>
<td>Sampling</td>
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<td>4</td>
<td>9/24,9/26</td>
<td>15</td>
<td>PCM</td>
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<tr>
<td>5</td>
<td>10/1,10/3</td>
<td>15</td>
<td>Companding</td>
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<tr>
<td>6</td>
<td>10/8,10/10</td>
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<td>Review</td>
</tr>
<tr>
<td>7</td>
<td>10/15,10/17</td>
<td>12</td>
<td>Low-speed modems</td>
</tr>
<tr>
<td>8</td>
<td>10/22,10/24</td>
<td>12</td>
<td>High-speed modems</td>
</tr>
<tr>
<td>9</td>
<td>10/29,10/31</td>
<td>12</td>
<td>High-speed modems</td>
</tr>
<tr>
<td>10</td>
<td>11/5,11/7</td>
<td>13</td>
<td>Serial interface, AT Commands</td>
</tr>
<tr>
<td>11</td>
<td>11/12,11/14</td>
<td>--</td>
<td>Review</td>
</tr>
<tr>
<td>12</td>
<td>11/19,11/21</td>
<td>Handout</td>
<td>HTML VIs, CGI VIs</td>
</tr>
<tr>
<td>13</td>
<td>11/26,11/28</td>
<td>***</td>
<td>No Classes – Thanksgiving Holiday</td>
</tr>
<tr>
<td>14</td>
<td>12/3,12/5</td>
<td>Handout</td>
<td>Remote Control Using the Web</td>
</tr>
<tr>
<td>15</td>
<td>12/10,12/12</td>
<td>--</td>
<td>Student research project presentations</td>
</tr>
<tr>
<td>16</td>
<td>12/15</td>
<td>--</td>
<td>Completion of Research Project by 5:00 pm</td>
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<tr>
<td>WEEK</td>
<td>DATE</td>
<td>LAB NUMBER</td>
<td>LAB EXPERIMENT</td>
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<tr>
<td>1</td>
<td>9/2</td>
<td>***</td>
<td>No Lab – Follows Friday schedule</td>
</tr>
</tbody>
</table>
| 2    | 9/9  | 1          | Analog I/O DAQ Programming  
**Informal Lab Report** |
| 3-5  | 9/16,9/23,9/30 | 2 | Digital DTMF Encoder/Decoder  
**Formal Lab Report** |
| 6-7  | 10/7,10/14 | 3 | PCM and Digital Companding  
**Informal Lab Report** |
| 8-9  | 10/21,10/28 | 4 | QPSK Modem Design  
**Informal Lab Report** |
| 10-11 | 11/4,11/11 | 5 | RS-232 Terminal Program  
**Formal Lab Report** |
| 12-13 | 11/18,11/25 | 6 | File Transfer Program  
**Formal Lab Report** |
| 14-15 | 12/2,12/9 | 7 | Remote Control of DAQ  
**Informal Lab Report** |
FORMAL LAB REPORTS

General Comments:
- Each lab group will consist of at most 2 students.
- 1 lab report will be submitted per group.
- Each lab report will be typed using a word processor.
- The lab report should be formal with no reference to the first person.
- The lab report will be weighted by a factor equal to the number of weeks to complete the lab experiment covered within the lab report.

Report Format:
- Page 1: Course number, lab number and title, names of students reporting, date, and executive summary. The Executive Summary is a concise paragraph summary of the entire report. It describes what you did to complete the experiment and it contains a brief summary of your results. It should also indicate what you learned from the lab experiment and why the lab was significant.
- Page 2: A brief summary of the Purpose of the lab experiment, a detailed summary of the Theory and Design information pertinent to the lab experiment, and a brief summary of the Testing Procedure.
- Page 3: Detailed summary of Results.
- Attachments: Copy of your LabVIEW program with correct results indicated and complete documentation (VI online description, online description for each control and indicator, title information on the front panel, documentation on the block diagram explaining each section). Include answers to all questions asked within the lab handout. Also, you should include theoretical formulas and calculations, measured results, simulation results, plots of results, circuit diagrams, etc.

Grading Criteria:

<table>
<thead>
<tr>
<th>Items for consideration</th>
<th>Grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab experiment completed on-time with technically accurate results</td>
<td>40</td>
</tr>
<tr>
<td>LabVIEW program with correct results indicated and complete documentation</td>
<td>30</td>
</tr>
<tr>
<td>Content of lab report</td>
<td>20</td>
</tr>
<tr>
<td>Spelling, grammar, writing style</td>
<td>10</td>
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</tbody>
</table>

INFORMAL LAB REPORTS

General Comments:
- Same as for the formal lab reports.

Report Format:
- The Informal Lab Report will consist of only your LabVIEW program with correct results indicated and complete documentation. Include answers to all questions asked within the lab handout.

Grading Criteria:

<table>
<thead>
<tr>
<th>Items for consideration</th>
<th>Grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab experiment completed on-time with technically accurate results</td>
<td>70</td>
</tr>
<tr>
<td>LabVIEW program with correct results indicated and complete documentation</td>
<td>30</td>
</tr>
</tbody>
</table>